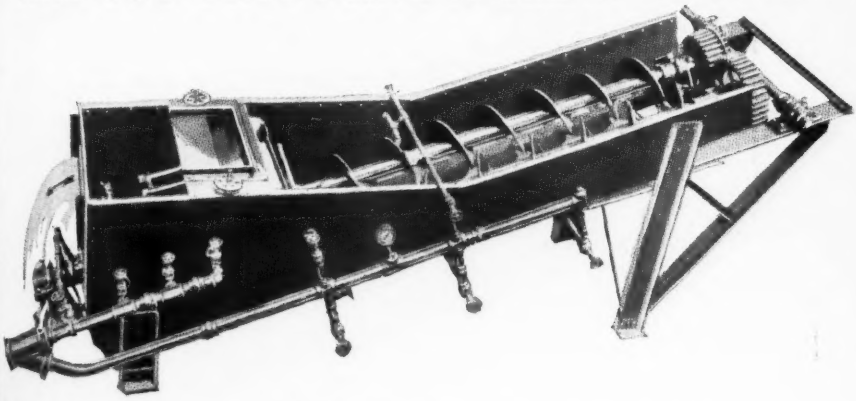
Pit and Quarry

SAND ▪ GRAVEL ▪ STONE

HANDLING ▪ CRUSHING ▪ SCREENING ▪ WASHING

ARE YOU PRODUCING A CLEAN PRODUCT?



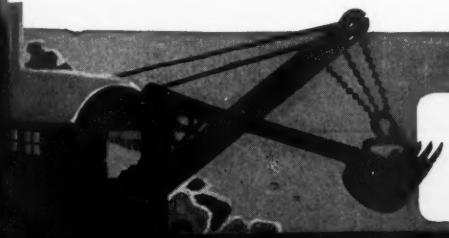
Use the PERFECT Classifier for cleaning sand, gravel, limestone, coal, phosphate, fluorspar, slag, ore, etc.

PERFECT CLASSIFIER COMPANY

Manufacturers of ORE CLASSIFIER MACHINERY

105 First Ave., South NASHVILLE, TENN.

For other information see Page 106.



September 1, 1925

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Circulation 7,600

At last!

The Perfect Crane-Shovel

INDUSTRIAL

CRAWLING TRACTOR CRANES

INDUSTRIAL WORKS · · · BAY CITY · MICHIGAN

You don't pick any lemons from the peach tree

You have never heard any ERIE owner say "I had to sell my ERIE for $4,000 or $5,000 less than it cost, after one season's use."

Nor have you ever heard any ERIE Shovel salesman explain: "Oh, the machine that went to pieces on that rock job was one or two years old— we are building shovels much better now."

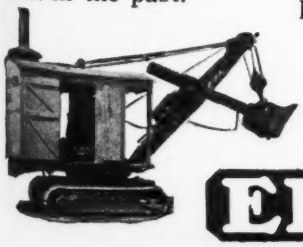
Think of it!— with 3,500 machines now carrying the ERIE nameplate, and being selected for the hardest jobs everywhere —there are no "lemons" to explain away, or apologize for!

The battle-scarred ERIES that have each dug well over half a million cubic yards of hard material are not "Side-stepped" by ERIE Shovel salesmen, but are hunted up and displayed with pride.

Of course nobody expects these warriors to look like new, or to have the improvements that you find on a 1925 ERIE. But you do know, for a certainty, that any 5-year-old or 10-year-old ERIE is still very much a shovel— good for a big day's work.

Every shovel takes its character from the organization that built it

Capable designers and seasoned mechanics turn out a reliable machine because that's the only kind they know how to build. But it's banking on a miracle to expect such a shovel from a plant that has produced an entirely different kind of fruit in the past.



ERIE STEAM SHOVEL CO., Erie, Pa., U.S.A.

Builders of ERIE Shovels, Cranes, Ditchers, Draglines, Trench Hoes, etc.

Branch Offices: Boston, New York, Philadelphia, Pittsburgh, Atlanta, Chicago

Representatives throughout the U. S. A.

ERIE Revolving Shovels

The Cleveland Forty-Four and Up-Keep Expense

That the good Forty-Four is a fast cutter goes without saying. That it kicks less—that it cleans the holes well—that the drill-runners like it — all may be taken for granted.

Then how about up-keep expense? Consider a Coal and Iron Company's mine in Pennsylvania. They've been operating five Cleveland Forty-Fours over a period averaging nearly six years each at a repair cost per drill per month of only $2.64!

Another—one of the biggest railroad lines in the country—operating twelve Forty-Fours varying periods of from three to five years for each drill, **at a repair cost per drill per month of a little more than fifty cents!**

Ask us for Bulletin 49

The Cleveland Rock Drill Co.

3734 East 78th Street,
CLEVELAND, OHIO

CHICAGO, ILL.
605 S. Dearborn St.

DETROIT, MICH.
428 Insurance Exchange Bldg.

PHILADELPHIA, PA.
The Bourse Bldg.

BOSTON, MASS.
113 Pearl St.

NEW YORK CITY
30 Church St.

ST. LOUIS, MO.
2091 Railway Exchange Bldg.

BIRMINGHAM, ALA.
403 N. 24th St.
Box 2028

PITTSBURGH, PA.
922 Farmers Bank Bldg.

NEGAUNEE, MICH.
222 Heath St.

Canadian Trade Supplied by The Cleveland Pneumatic Tool Co. of Canada, Ltd., Toronto, Ontario
British Representatives, John McDonald & Co., Pollokshaws, Glasgow, Scotland.

CLEVELAND ROCK DRILLS

KOEHRING

Crane Excavator

66% Greater Clutch Frictional Area!

THAT'S why the Koehring has *Finger-tip control* at the levers!

Levers work easy because the 66% greater contact surfaces of the double outside band, equalizing friction *clutch* makes the levers work easy!

So, you have Finger-tip control without mechanical complications to help shift levers which ought not to be hard shifting in the first place. The Koehring operator does not lose the *"feel"* of the bucket —an important factor in accuracy of operation!

Crane Capacities

No. 1—¾ cu. yd. clamshell bucket on 40 ft. boom, standard.

Lifting capacity, 10 tons at 12 ft. radius. 4 cylinder, 5″ x 6″ gasoline engine, 1000 R.P.M.

No. 2—1 cu. yd. clamshell bucket on 45 ft. boom, standard.

Lifting capacity, 15 tons at 12 ft. radius. 4 cylinder, 5¾″ x 7″ gasoline engine, 1000 R.P.M.

KOEHRING HEAVY DUTY

Write for Crane Excavator Bulletin No. Cr.32.

KOEHRING COMPANY

PAVERS, MIXERS—GASOLINE CRANES, DRAGLINES AND SHOVELS

MILWAUKEE, WISCONSIN

Sales Offices and Service Warehouses in principal cities

Foreign Dept., Room 1370, 50 Church St., N. Y.
Canada, Koehring Company of Canada, Ltd., 105 Front St., East, Toronto, Ontario.
Mexico, F. S. Lapum, Cinco de Mayo 21, Mexico, D. F.

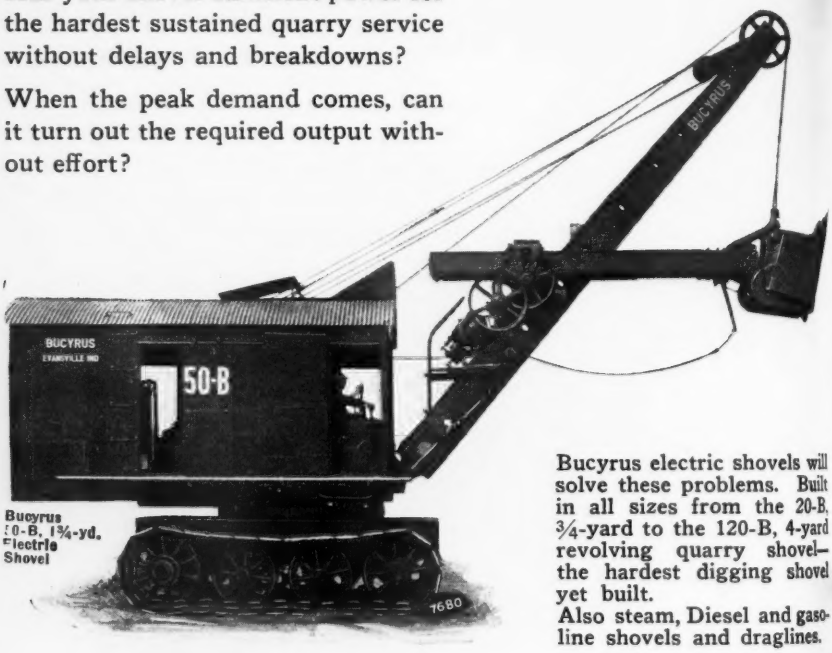
A2688

THE PEAK DEMAND

A power plant is designed with sufficient capacity to meet the highest future peak demand. What about your loading equipment?

Has your shovel sufficient power for the hardest sustained quarry service without delays and breakdowns?

When the peak demand comes, can it turn out the required output without effort?



Bucyrus 50-B, 1¾-yd. Electric Shovel

Bucyrus electric shovels will solve these problems. Built in all sizes from the 20-B, ¾-yard to the 120-B, 4-yard revolving quarry shovel—the hardest digging shovel yet built.
Also steam, Diesel and gasoline shovels and draglines.

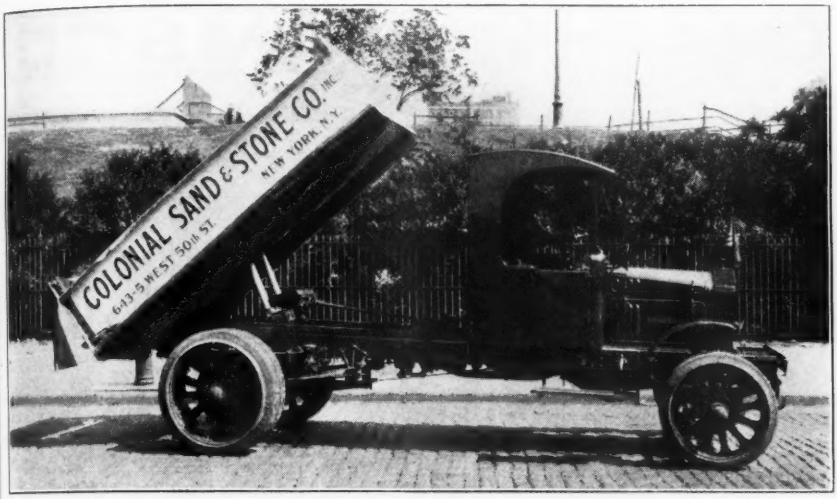
BUCYRUS COMPANY, South Milwaukee, Wis.

Established in 1880

Railroad Type and Revolving Shovels of All Sizes, Dragline Excavators, etc.

New York Pittsburgh Chicago Birmingham San Francisco Denver Tokyo London

BUCYRUS



Heil Excavating Body with No. 6 Hoist on Pierce-Arrow Truck. Body Capacity 162 cu. ft.

Colonial Chooses Heil Hoists

SPECIFIED Heil because they wanted hoists that never fail, hoists that dump all the load, hoists that dump quickly and at the highest angles. The Heil Hoist has proved itself satisfactory for Colonial Sand and Stone Co. as well as for hundreds of other sand and gravel operators in the United States.

Catalog No. 140 is the booklet you want for selecting dump truck equipment. It contains twenty-eight pages with large size pictures of each body model along with tabulated dimensions and weights. If you haven't received your copy yet, send in the coupon below.

Bulletins 150 and 145

Bulletin 150 tells about Heil Ford Rocker Gravity Bodies and Hand Hoist Units. Heil Dump Bodies and Hoists for trucks allotted from Surplus War Materials are described in *Bulletin 145.*

THE HEIL CO.

1139-75 Montana Avenue Milwaukee, Wis.

One of our Twenty-five Distributors is near you!

The Heil Co.,
1139-75 Montana Ave.,
Milwaukee, Wis.

I have checked the literature I want

Catalog 140.....Bulletin 150....., 145.....

Name .....

Address .....

City .....

"No Signs of Wear or Abuse"

This picture shows an Amsco Missabe Manganese Steel dipper with Vanderhoef front exactly as it looked after tearing down and excavating the stone walls of the old Union Station at Springfield, Mass. On June 16, 1925, our customer wrote:

"The walls were of old masonry and the stones weighed six to seven tons, there being about twelve hundred yards.
At the completion of the work the dipper was apparently as good as new and did not show any signs of wear or abuse to which it had been put."

The rugged endurance and long wearing life experienced in this instance can be employed to your own profit. Quotations and engineering service will be supplied on request.

AMERICAN MANGANESE STEEL CO.

General Offices: 388 E. Fourteenth St., Chicago Heights, Ill.

Foundries: Chicago Heights, Ill.; New Castle, Del.; Oakland, Cal.; Los Angeles, Cal.; Denver, Colo. Southern Manganese Steel Co., St. Louis, Mo.

Du Pont chemical engineers insure uniformity of quality by chemical control through every step of manufacture from raw materials to finished product.

DU PONT

Why It Pays to Use Reliable Accessories

COMPLETE detonation of an *explosive charge is the end* of a perfect shot! So much depends upon the action of blasting accessories—cost of explosives, expense of directing, drilling and loading and the desired results—that explosives users cannot afford to imperil the success of their operations by resorting to the use of inefficient blasting accessories.

Du Pont Blasting Accessories are designed, made and guaranteed by the du Pont Company, manufacturers of explosives since 1802. When you order blasting accessories, specify du Pont to insure complete detonation—the end of a perfect shot!

Look for the du Pont "oval" on the container of the following efficient and dependable du Pont Blasting Accessories:

Blasting Caps
Delay Electric Blasting Caps
Blasting Machines
Galvanometers
Leading Wire
Electric Blasting Caps
Fuse
Delay Electric Igniters
Rheostats
Cap Crimpers
Tamping Bags

Write for Blasting Accessories Catalog containing descriptions and illustrations of du Pont accessories and practical information about their use.

E. I. DU PONT DE NEMOURS & CO., INC.
Explosives Department
WILMINGTON, DELAWARE

Branch Offices:

Birmingham . . . Ala.	Huntington . W. Va.	Portland . . . . Ore.
Boston . . . . Mass.	Joplin . . . . . Mo.	St. Louis. . . . Mo.
Buffalo . . . . N. Y.	Kansas City. . . Mo.	San Francisco . . Cal.
Chicago . . . . Ill.	Mexico City. . Mex.	Scranton. . . . Pa.
Denver . . . . Colo.	Miami. . . . . Fla.	Seattle . . . . Wash.
Duluth . . . . Minn.	New York . . . N. Y.	Spokane . . . Wash.
El Paso. . . . Tex.	Pittsburgh . . . Pa.	Springfield . . . Ill.

Du Pont Products Exhibit, Atlantic City, N. J.

POWDER MAKERS SINCE 1802

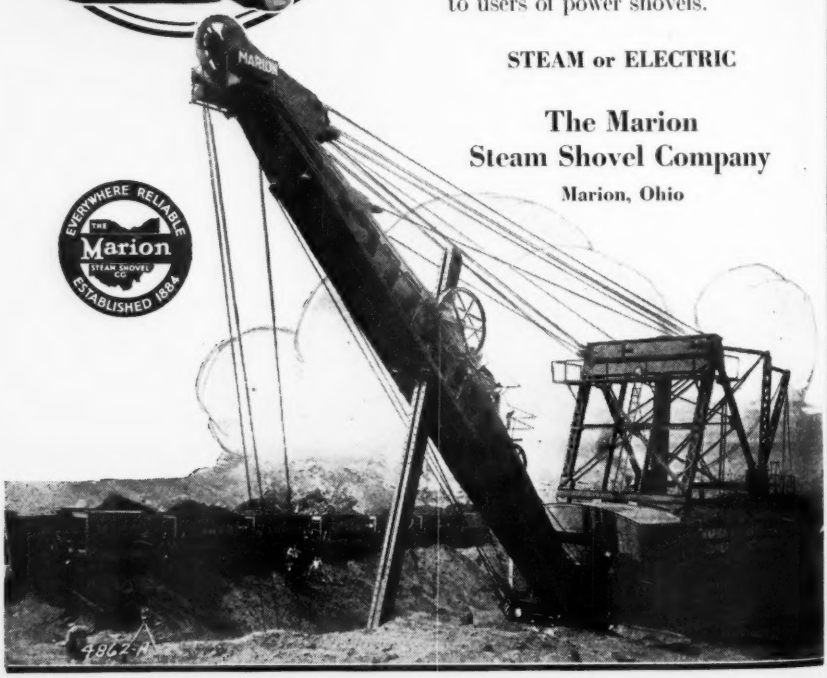
Eight cubic yards at a dip

MODEL 350 is the world's largest shovel. Handling material at the rate of eight cubic yards a dip, this giant machine will fill an ordinary open top car in three or four swings. Thus greater possibilities than ever before are offered to users of power shovels.

STEAM or ELECTRIC

The Marion Steam Shovel Company

Marion, Ohio



EVERYWHERE RELIABLE — THE Marion STEAM SHOVEL CO. — ESTABLISHED 1884

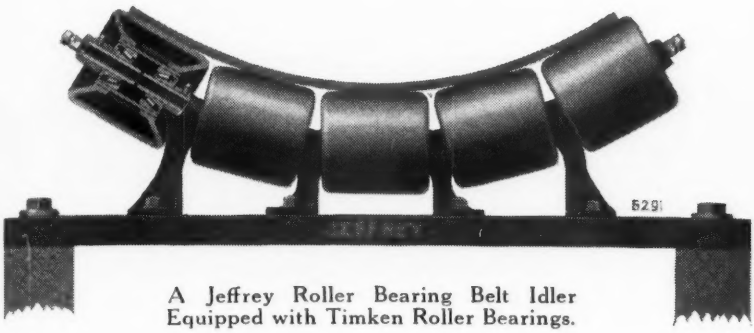
With standard shovel equipment sizes in this type range from 1½ cu. yd. to 8 cu. yd. dipper; 45-ft. to 90-ft. boom. With dragline attachments, buckets range from 2 cu. yd. to 6 cu. yd; booms from 70-ft. to 150-ft. Steam or electric power can be furnished.

2403

Marion Power Shovels

Jeffrey Belt Conveyors

For Bulk Material and Packages



A Jeffrey Roller Bearing Belt Idler
Equipped with Timken Roller Bearings.

JEFFREY Improved Roller Bearing Belt Idlers are the result of the latest and best engineering experience. They are economical in first cost and trouble free. Bearing friction is practically eliminated and the life of the belt greatly increased.

You will be interested in the following points of construction:

1—Timken Roller Bearings in every pulley.

2—Grease seals hold the lubricant and keep out dirt and grit.

3—High pressure greasing system with grease fittings easily and safely accessible, even when belt is running.

4—Well balanced cast iron pulleys withstand wear and exposure to all kinds of climates.

5—Pulleys mounted on steel channel bases, will not get out of alignment.

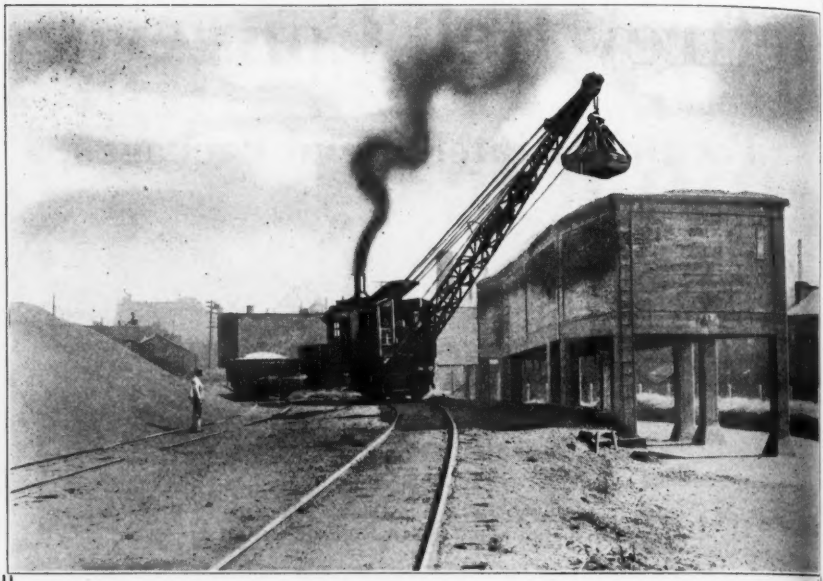
6—Proper curvature to conform to troughing of belt.

7—Built to stand heavy service in handling sand, gravel, stone, ore and similar materials.

The New Jeffrey Belt Conveyor Catalog No. 409-F contains many photographs and valuable information on belt conveyor installations. Different types of standard grease oiling and also roller bearing idlers are illustrated and described. Convenient classification makes it easy to determine the right conveyor for your needs. Write for it.

The Jeffrey Mfg. Co., 917-99 North Fourth Street Columbus, Ohio

JEFFREY
MATERIAL HANDLING EQUIPMENT



Here is an Important Reason Why the

"American" Locomotive Crane

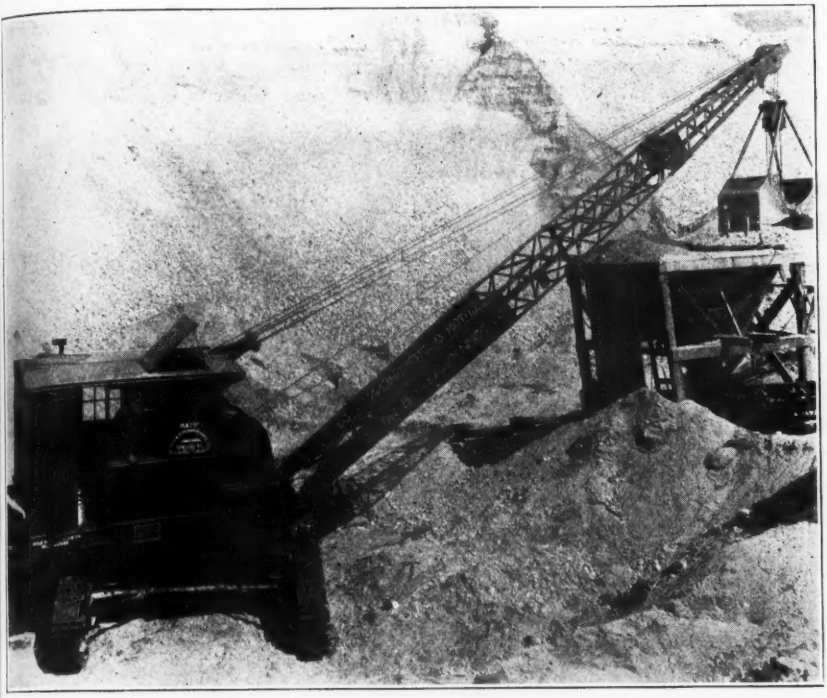
is Best for Grab Bucket Work

"AMERICAN" Locomotive Cranes have an Independent Friction on the drum that winds the opening line of a clamshell bucket. Any crane owner who has experienced the advantages of this feature will tell you that in handling material from a car or bin, or excavating in a shored trench this one feature is the means of saving much time and avoiding much profanity.

Suppose that in lowering the bucket into a car or bin it catches on the edge; the minute any attempt is made to lift it with the regular hoisting line the bucket closes and takes hold. An "AMERICAN" Locomotive Crane will lift it clear with the opening line.

This is not the "AMERICAN'S" only point of superiority at grab bucket work. Ask us about the others.

AMERICAN
HOIST & DERRICK CO.
Saint Paul, Minn.
New York, Chicago, Pittsburgh, Seattle, New Orleans



Here's How

to handle gravel profitably

The Peterson Sand & Gravel Co., of Janesville, Wisconsin, know how to handle gravel profitably.
They use an O-S Type "E" Crane with 40-foot boom and 1-yard O-S Clamshell to load their hopper and a belt conveyor carries the gravel to the washing plant.

Many pit operators are using Peterson's System and their answer is "maximum yardage" at the end of each day.

The Type "E" is only one of the many sizes and styles of cranes we manufacture—

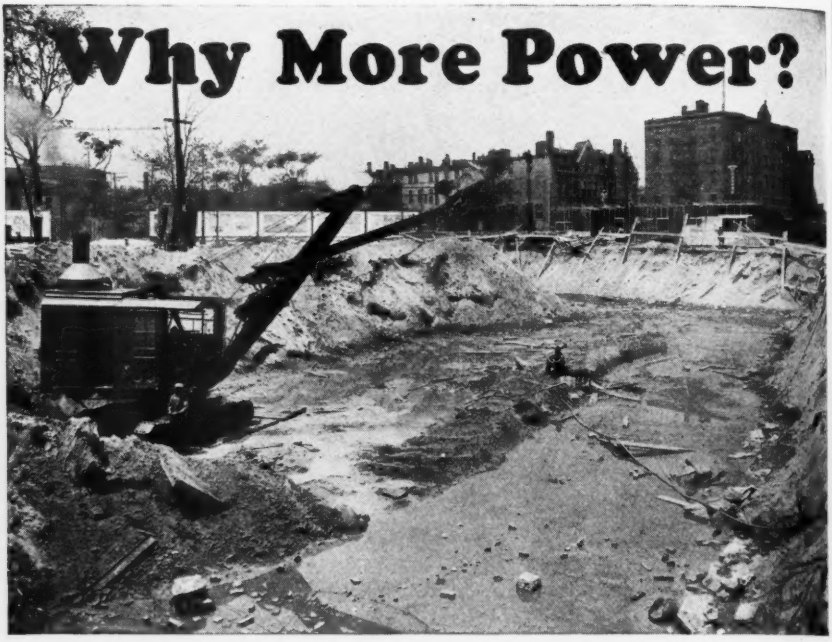
Send for catalog No. 37—it illustrates them.

ORTON & STEINBRENNER CO.

Locomotive Cranes, Flexible Tread Cranes, Gantry Cranes, Truck Cranes.

608 So. Dearborn Street
CHICAGO, ILL.

Clamshell Buckets, Orange Peel Buckets, Rock Crushers, Power Shovels.



Why More Power?

Why put larger engines and a larger boiler on a steam shovel? Why not be content to take a little bite at a time and not so many bites every hour?

You contractors know the answer. You must move dirt faster to make profits in the excavating game.

That's why we put 6x8-inch engines and a 48-inch, 150 lb. boiler on the No. 2. And that's why—in any digging, the No. 2 will handle a larger dipper than any shovel at or near its price.

Gas Shovels • Locomotive Cranes • Clam-shell Buckets • Pile Drivers

C-2-96

McMyler-Interstate

NEW YORK BUFFALO PHILADELPHIA PITTSBURGH CLEVELAND DETROIT CHICAGO SAN FRANCISCO LOS ANGELES

Modern Massillon Steam Shovel

GIVES EFFICIENT SHOVEL SERVICE

The Massillon Steam Shovel has been built to meet your need for Efficient Shovel Service. It combines those qualities recognized in expert engineering practices as standard. It is equally efficient with clam shell, as part of dragline equipment, and as locomotive crane.

Mobility and Accessibility are qualities which add much to the machine's efficiency. With the Massillon you can handle maximum quantities of any kind of material.

You will realize these facts after reading about how it is constructed. Write for description detail.

Built By

THE RUSSELL & CO.

MASSILLON, O.

The MODERN MASSILLON

Steam — 3/4 – 7/8 RANGE — Shovel

Guarantee
Owen Buckets, properly installed and operated, are guaranteed to do a bigger day's work than any other bucket of the same weight and capacity—
—or—
Write your own guarantee!
THE OWEN BUCKET CO.

A Mouthful at Every Bite

The fierce attack of the jungle tiger is concentrated in his steel-like jaws, whose vicious and powerful force gains for him a mouthful at every bite. How like an Owen Bucket!

Built on the principle of correct distribution of weight and properly applied leverage, Owen Buckets possess the unusual ability of performing consistently — day after day — the work of tearing materials from ground or pile at the rate of a chuck-full bite at every grab.

There are nine specific points in superior construction that mark the Owen as a Bucket which means a greater value for your digging dollars. These advantages have been described and illustrated in a small folder which we call "2-A." We shall be glad to send you a copy, for we want you to know about the strong and sturdy construction of Owen Buckets—their adaptability—their earning power.

Write for the folder today!

The OWEN BUCKET Co.

906 Rockefeller Building Cleveland, Ohio

Baltimore Chicago Dallas Los Angeles Minneapolis Philadelphia
Pittsburgh New York Miami Portland St. Louis San Francisco

Here is a ¾ yard Type "J" Owen Digging Bucket excavating pipe line trenches and loading into trucks. This is one of three Buckets owned by D. Lowensohn, Cleveland.

OWEN CLAMSHELL BUCKETS INSURE A BIGGER DAY'S WORK

Owen Buckets

INSURE A BIGGER DAY'S WORK

© OBCo

1½ yard bucket - 1000 yards a day

Tuohy & Upton, Flushing, N. Y., have used Hayward Buckets for the past 13 years, and consider "these buckets the best on the market"—for very good reasons:
Each is a 4-job bucket, handling sand, gravel, crushed stone or cinders to the extent of 1,000 yards a day.
Performance is dependably consistent, and "the service given by the Hayward Company very satisfactory."
Please read Mr. Upton's letter—we're satisfied to rest our case with him or with any Hayward user.

THE HAYWARD COMPANY

54-56 Church St.,
New York, N. Y.

Builders of Clam Shell, Orange Peel, Drag Line and Electric Motor Buckets; Dredging, Excavating and Coal Handling Machinery.

THOS. F. TUOHY
JOSEPH UPTON

ESTABLISHED 1894

TUOHY & UPTON, INC.
GENERAL CONTRACTORS
LAWRENCE ST. AND MYRTLE AVE.
FLUSHING - NEW YORK

ROADS
SEWERS
GRADING

STEAM ROCKING
CEMENT - STONE
SAND - GRAVEL

June 9th, 1925.

Rickard and Company, Inc.,
25 Spruce Street,
New York, N.Y.

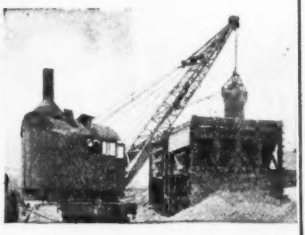
Gentlemen:

We are pleased to say that we have used Hayward Buckets for the past 13 years in our business of handling concrete materials such as sand, gravel, crushed stone, and cinders, and consider these buckets the best on market for our purpose. We handle approximately 1000 cubic yards of material daily with each of our one and one half yard buckets, unloading from barges alongside dock and from storage piles to hoppers.

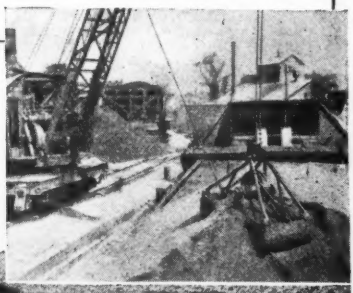
We have standardized on Hayward Buckets because we have always found them dependable and the service given by the Hayward Company very satisfactory.

Very truly yours,

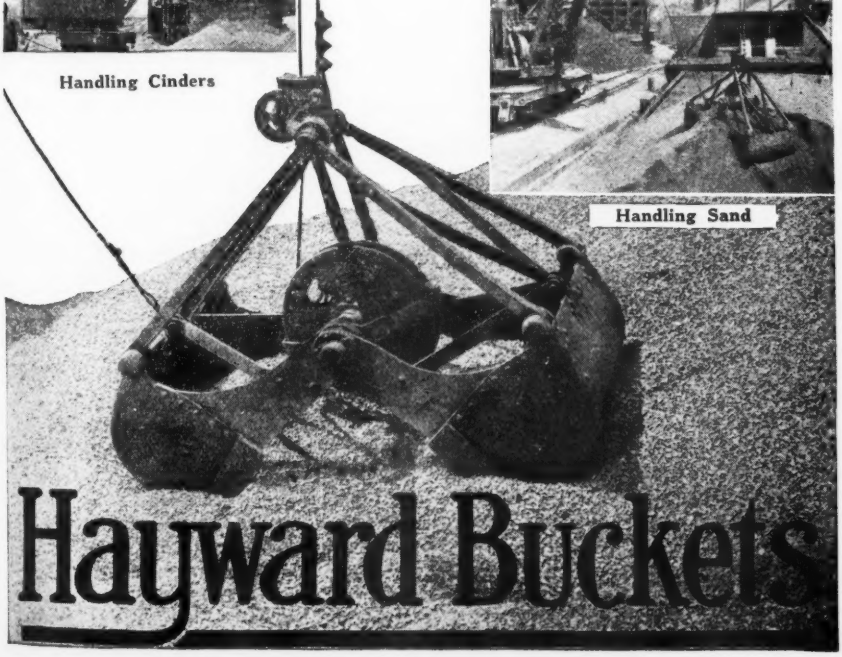
TUOHY & UPTON, INC.
By Joseph Upton



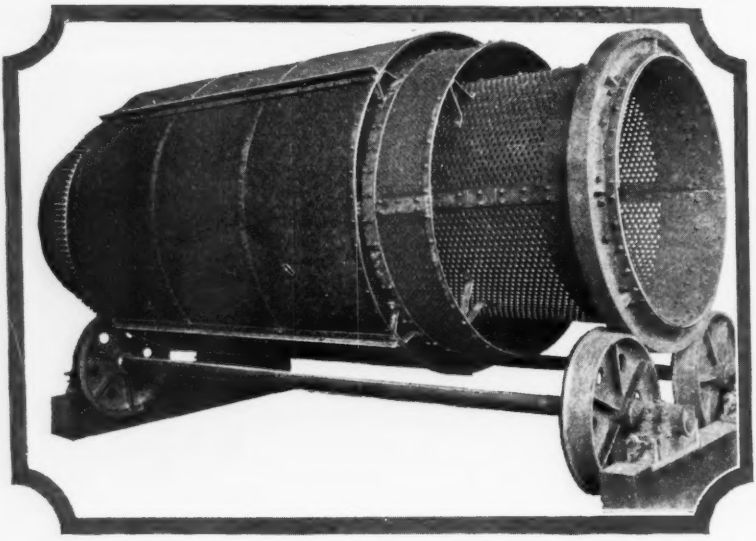
Handling Cinders



Handling Sand



Hayward Buckets



Webster Revolving Screens

FOR EFFICIENT screening in Sand, Gravel and Stone Crushing Plants, Webster Revolving Screens are reliable and dependable in operation. They are accurately designed and ruggedly built for years of hard service—that means lasting satisfaction.

Built in various types and sizes with capacities to suit the individual installation.

Let our engineers help you in the selection of proper screens for your plant. They are at your service.

Webster equipment for sand, gravel, cement and stone crushing plants includes belt conveyors, bucket elevators, screens, screw conveyors, chain, sprockets, buckets, etc.

Catalog sent on request.

THE WEBSTER MFG. COMPANY

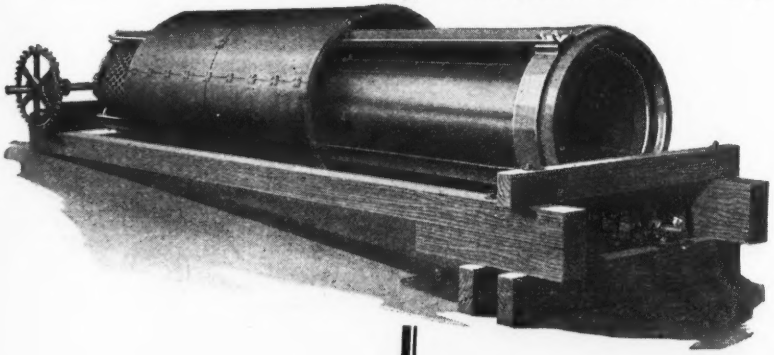
4500-4560 Cortland Street

CHICAGO

TELSMITH *Scrubs* YOUR GRAVEL—

Every Telsmith Washing Screen is equipped with a scrubber, which will clean any gravel of a commercially washable character. The material is cascaded—sprayed—rubbed—soaked, until the dirt is thoroughly discouraged. Then the aggregate is graded into sand, fine rock, coarse rock—two, three or four grades, according to requirements. Both washing and sizing operations are performed in one cylinder with sand jacket. Water consumption is kept down to a minimum. Floor space and head-room are much less than required for other washing devices. The cost of the bins and transmission are both considerably reduced. Best of all, the aggregate is CLEAN beyond possibility of criticism. That's why Telsmith Washing Screens have sold like "hot cakes" during the last five years. Glad to send you Bulletin No. GP-15. No obligation whatsoever.

Telsmith Heavy-Duty Washing Screen, equipped with steel rollers, two-piece head-ring and renewable steel tracker ring.



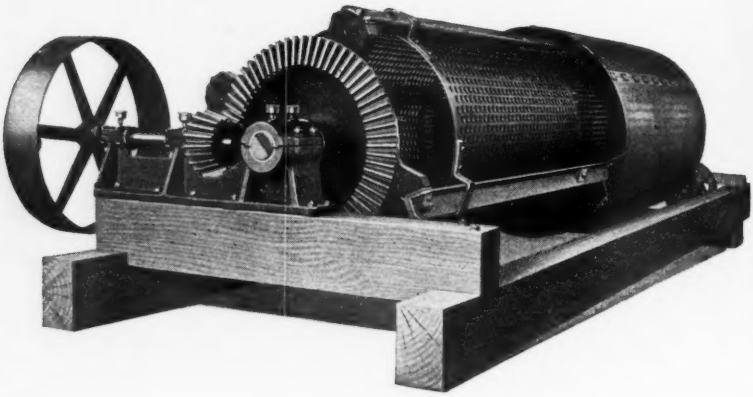
SMITH ENGINEERING WORKS

3183 Locust St., Milwaukee, Wis.

Canadian Representative, Canadian Ingersoll-Rand Co., Montreal, P. Q.

Old Colony Bldg., Chicago, Ill.
18 East 41st Street, New York City
Waldo Bros. & Bond Co., Boston, Mass.
Beckwith Machinery Co., Pittsburgh and Cleveland
Seibert-Milburn Co., Columbus, Ohio
Geo. F. Smith Co., St. Louis, Mo.
Borchert-Ingersoll, Inc., St. Paul, Minn.
Bunting Hardware Co., Kansas City, Mo.
J. W. Batholow Co., Dallas, Texas
Interstate Eq. & S. Co., Omaha, Neb.
Alamo Iron Works San Antonio, Tex.
Sheehan & Co., El Paso, Tex.

Without Peer!



ARE the Toepfer Screens, built to meet the most exacting requirements and creating a big demand in the pit and quarry industry.

The Toepfer Screens are substantially built and are of heavy construction. The best materials are used throughout, standing the most excessive wear and for heavy duty.

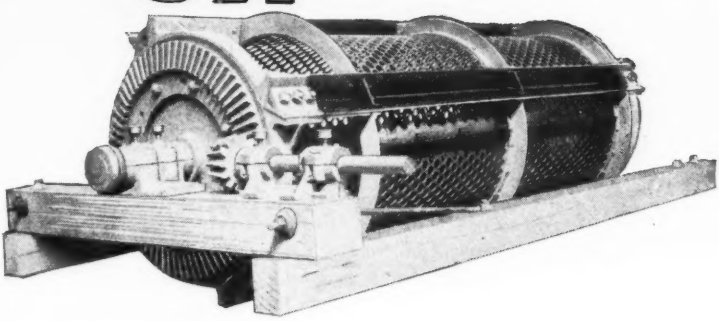
Submit your screen problems to us and let us solve them. We have an interesting booklet giving a vivid description of our products. Write for it today.

W. TOEPFER & SONS CO.
Broadway and Menominee St.,
MILWAUKEE, WIS.

TOEPFER

REVOLVING SCREENS

SCREENS by S-A



built for strenuous service

Every screen designed and produced in the S-A Shops is strong enough for its particular duty.

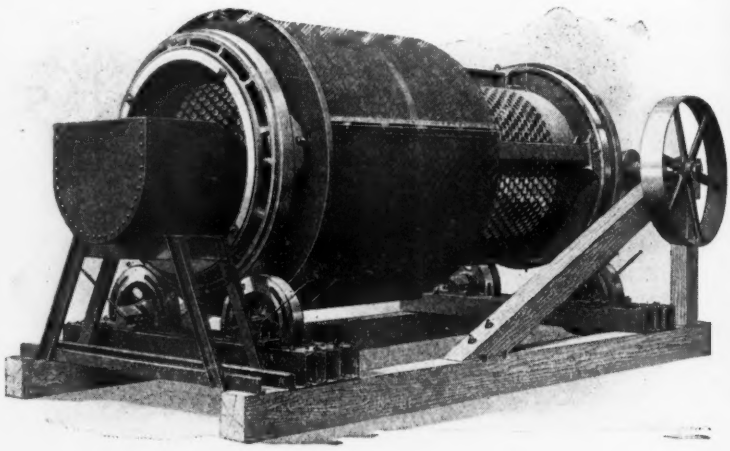
Building ruggedness into the screen saves a lot of grief when on the job.

If you want an expert recommendation on the correct screen for your requirements, ***write today.***

DESIGNERS & BUILDERS OF LABOR SAVING MACHINERY

STEPHENS-ADAMSON

MFG. CO. AURORA, ILL.



SCREENING EQUIPMENT

To meet the requirements of modern rock crushing plant operators, Allis-Chalmers have designed and successfully installed their Style "B" Open End Revolving Screens.

You will find the same rugged construction which characterizes all of Allis-Chalmers products thru a half century of experience. A complete line of screens, including the "Allis - Chalmers Compensated Type Shaking Screens."

Let our engineers figure on your requirements. Write for estimates.

Electrical Machinery
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Steam Engines
Condensers
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Gas Engines
Oil Engines
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Crushing & Cement Machy.
Flour Mill Machinery
Saw Mill Machinery
Air Compressors
Air Brakes
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Farm Tractors
Power Transmission Machinery
Perforated Metal
Timber Treating and Preserving Machinery

ALLIS-CHALMERS
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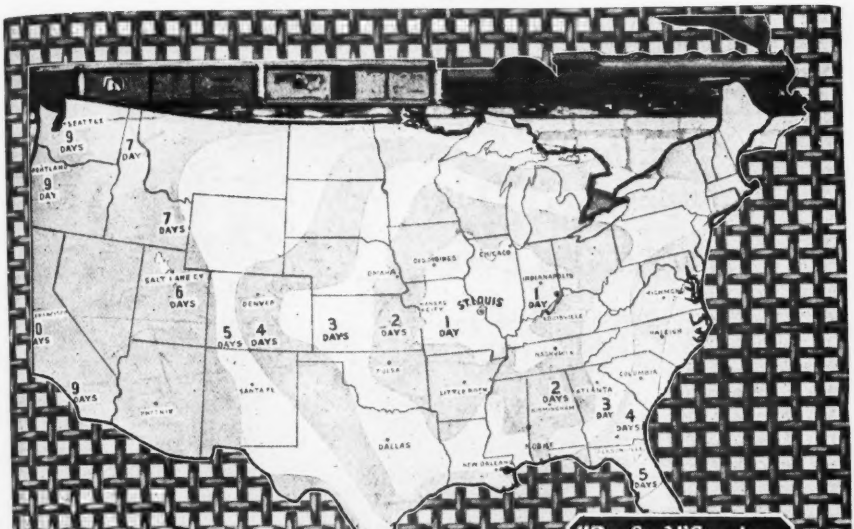

"Perfect" Service

1 Most **COMPLETE** wire cloth **SERVICE**
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3 Most **RELIABLE** wire cloth **SERVICE**
4 Most **ADAPTABLE** wire cloth **SERVICE**
5 Most **ECONOMICAL** wire cloth **SERVICE**

LUDLOW-SAYLOR SERVICE IS THE MOST ACCESSIBLE WIRE CLOTH SERVICE

Package Car Delivery puts us **nearest to your needs.**

This map sets forth the time required for Package Car Delivery from St. Louis; **and express arrives in half the time.**

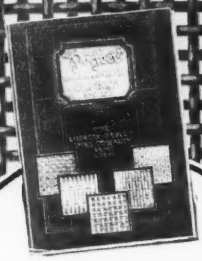
Our tremendous stocks supply Wire Cloth and Woven Screens for every purpose. Our Screen Book lists A Thousand "Perfect" Screens—every grade offered for any purpose by American manufactrurers, with **over two hundred additional grades not heretofore listed by any manufacturer.**

Ludlow-Saylor Screens are made in every mesh, of every metal, for all purposes. Whatever the grade or kind, the wire used is the finest yet developed for the purpose, properly and accurately woven, true to mesh and gauge throughout, its fullest vitality and resistance preserved and reinforced in the perfect finished screen.

Our Screen Book brings this service to your desk. This Text-Book gives **all information** on every Ludlow-Saylor screen. The comprehensive tables, with hundreds of actual-size illustrations, simplify comparisons and make it easy to **choose the best screen for your needs.**

Ask for your copy of Catalogue No. 47E,—The Text-Book on Screens. It is free upon request to all users of screens.

610 SOUTH NEWSTED AVE.



BETTER SEPARATION—a cleaner, more uniform product.

MORE TONS—per machine per horsepower, per man, per hour.

Send us one copy of Catalogue No. 47-E for our official below who is a user of screens.

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The city surrounded by the United States

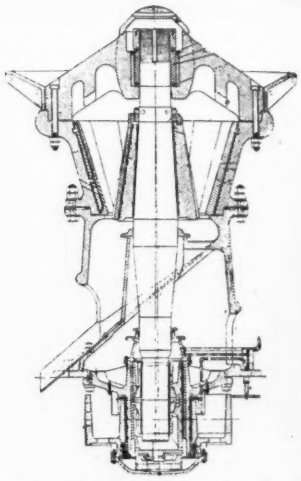
The LUDLOW-SAYLOR WIRE COMPANY St. Louis

THE CRUSHERS

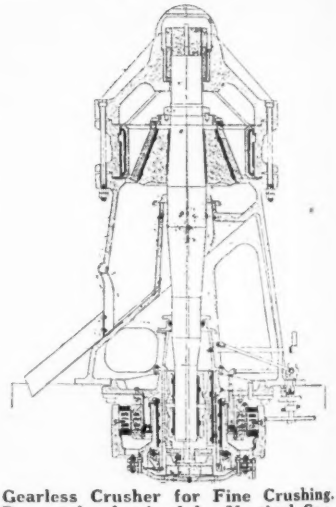
with the Troubles Left Out

WHY THEY LEAD

1—They are noiseless and run like watches.
2—50% greater capacity for same power.
3—Practically no wear on anything but head and concaves.
4—Short shaft and saving in head room with packed dust collars.
5—Shaft reinforced with self-locking head so that it cannot break where 90% of shafts have broken.
6—Can be driven right, left, or standard, as sent from shop.
7—Eccentric is turned by flexible coupling attached to pulley, which prevents side thrust and heating, as in geared crushers.
8—Ball and socket eccentric, self-aligning, eliminating friction and heating. Runs for years without attention.
9—Positive circulating oil system through filter and cut geared oil pump.
10—Made in our own shop by experts, trained for the job.
11—It is a crusher with the trouble left out. See it in operation, and you are unfit to listen to any geared crusher salesman. In fact, if you are near one of his machines, you can't hear him, if you are so inclined.



Standard Ball Bearing Gearless Crusher. Sizes No. 1 to No. 60—Weights 1,000 to 900,000 lbs.



Gearless Crusher for Fine Crushing. Do not be deceived by Vertical Concaves; that is not what makes a fine crusher.

12—Our fine crusher does the work of 4 geared crushers.

Send for catalogue and tell us what your problems are, and one of our experts will call on you without obligation on your part.

KENNEDY VAN SAUN MFG. & ENGR. CORP.

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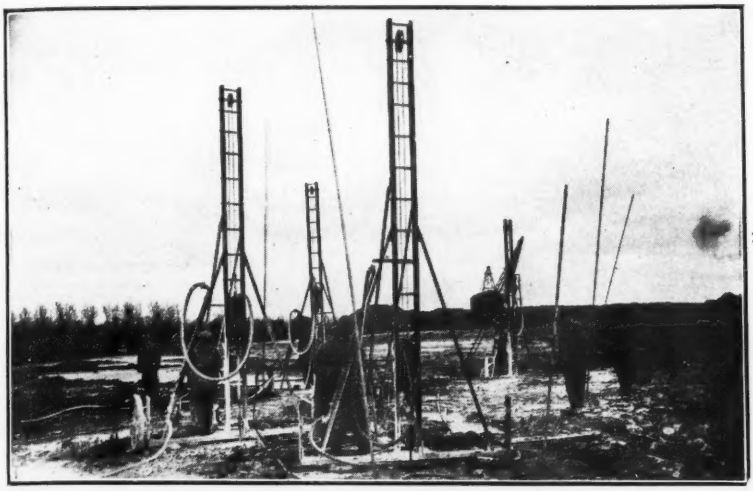

Four Model 21 Turbros on Derrick Rigs

Faster — Better

THE Model 21 Waugh Turbro Hammer Drill has been adopted by many limestone quarries for the primary drilling operations.

Reasons: the daily footage secured meets all expectations, holes are drilled and cleaned perfectly, and the sturdy construction of the machine minimizes mechanical troubles.

Using the Derrick Rig, set-ups and steel changes are easily and quickly made, and the daily over-all footage is materially increased.

Full information at the nearest branch office

THE DENVER ROCK DRILL MANUFACTURING COMPANY

DENVER COLORADO

Rock Drills, Drill Steel Sharpeners and Hole Punchers, Portable Hoists

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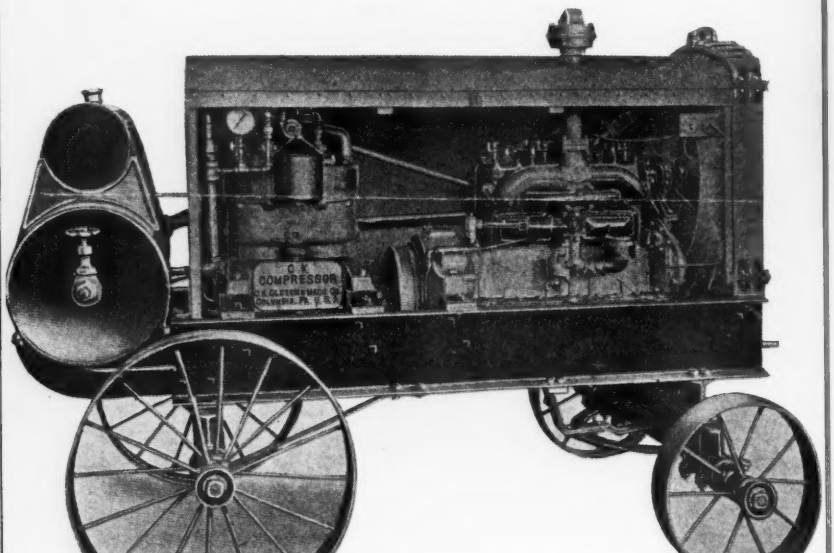
O AIR COMPRESSORS and HOISTS K



Have Proved Their Value

Your conditions will be assured of the same efficient and economical results characteristic of the O. K. Products. The O. K. Air Compressors are built to meet the heavy exacting requirements in the pit or quarry. They have been tried and tested and are correctly adapted to any air equipment.

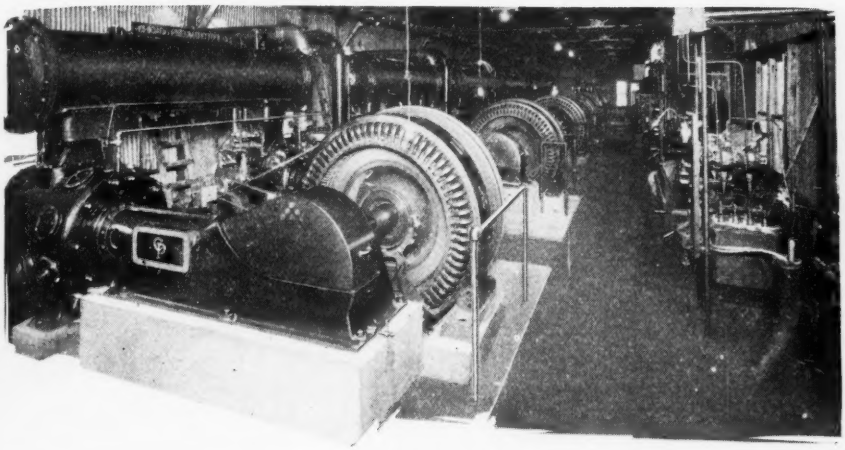
O. K. Portable Compressors are made with channel steel frame—strong but light—large heavy cylinders, efficient cooling system, "Duo Plate" air valves, and large bearings with positive lubrication.

They have larger capacity than other types, special carburetor control saving gas by idling motor when not supplying air. They are made in three sizes with capacities 118 cu. ft., 160 cu. ft., and 260 cu. ft. per minute. Powered with either gasoline or electric motor.

Write for Compressor Bulletin

O. K. CLUTCH & MACHINERY COMPANY

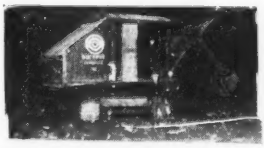
Box 305, Columbia, Pa.



Compressed Air Shovels Underground In the Philadelphia Subway

THE six direct-connected electric motor driven Chicago Pneumatic Compressors shown above are supplying 10,000 cu. ft. air per minute at 120 pounds pressure for operating air shovels, rock drills and clay diggers on the Philadelphia Subway contract, Patrick McGovern, Inc., Contractors.

The efficient 24-hour service being rendered by these six compressors is typical of the satisfactory results obtained wherever CP compressors are installed. Automatic regulation, self-lubrication and Simplate Valves insure steady, economical operation from CP's on every job where there is need for stationary or portable compressors.



One of the compressed air shovels operating under Broad Street, Philadelphia, on compressed air supplied by the Chicago Pneumatic compressors shown above.

Chicago Pneumatic Compressors are supplied in all sizes in steam, oil, belt or direct-connected motor driven types to meet all requirements.

For full particulars write for Bulletins.

Chicago Pneumatic Tool Company

6 East 44th Street, NEW YORK, N. Y.

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Canadian Pneumatic Tool Company, Ltd., Montreal, manufacturers of Chicago Pneumatic products in Canada
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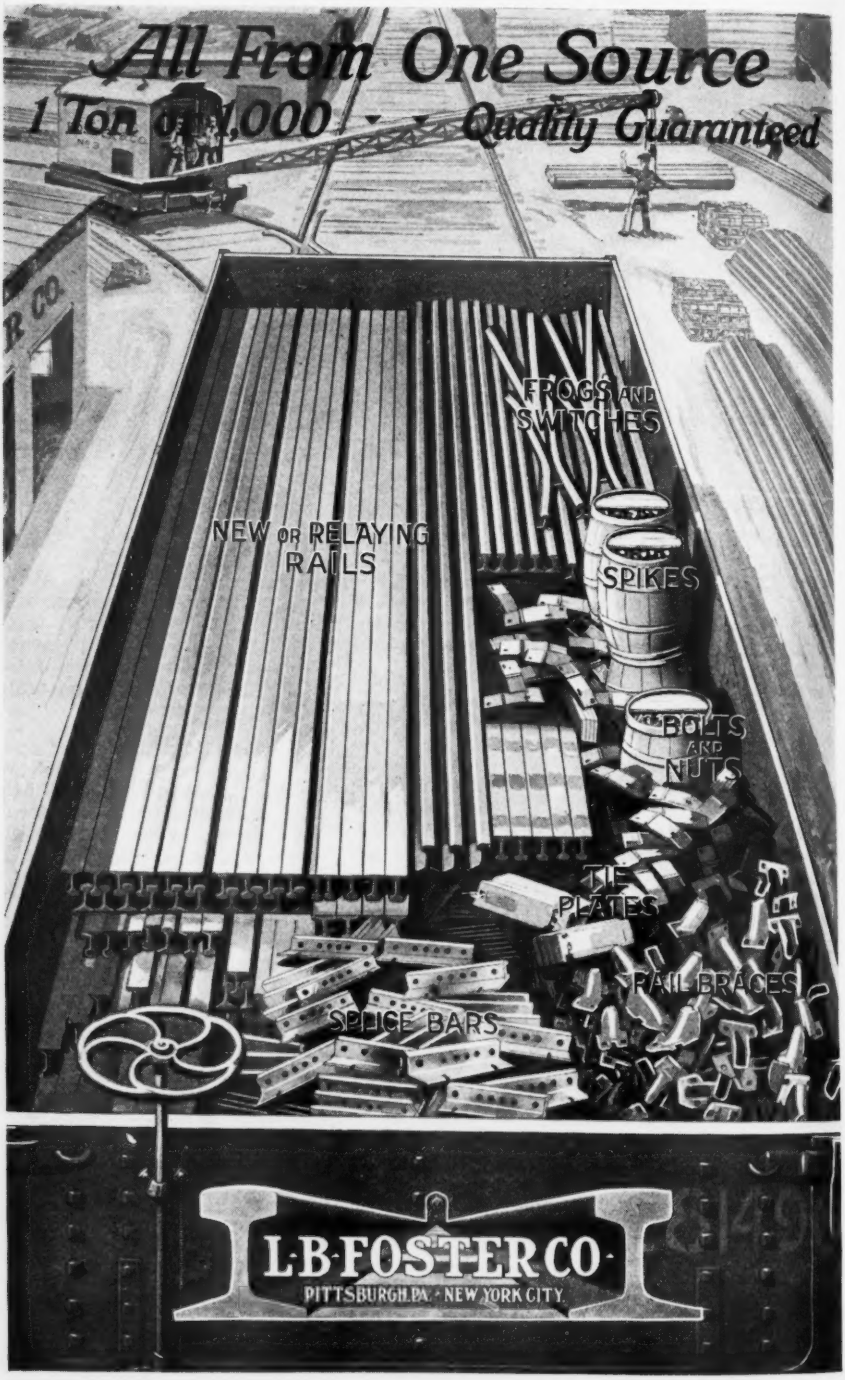
BOYER PNEUMATIC HAMMERS··LITTLE GIANT PNEUMATIC AND ELECTRIC TOOLS
CHICAGO PNEUMATIC AIR COMPRESSORS··VACUUM PUMPS··PNEUMATIC HOISTS
GIANT OIL AND GAS ENGINES ROCK DRILLS ·· COAL DRILLS

CHICAGO PNEUMATIC

Depend Upon *That Name*

C-184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NEW OR RELAYING RAILS
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RAIL BRACES
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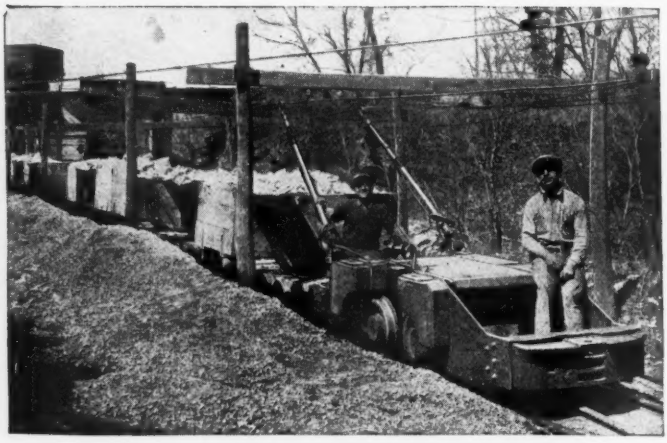
PORTER LOCOMOTIVES DOMINATE THE QUARRY FIELD

THE user of a Porter Locomotive gets not only a powerful, dependable unit—but also the result of 65 years of intensive endeavor to build the best—in design, material and workmanship.

We have ready a bulletin describing the types of Porters especially suitable for quarry service.

May we mail you a copy?

H·K·PORTER COMPANY,
— PITTSBURGH, PA. —



Electric Locomotives Are Better

If power is available, an electric locomotive is the right kind of transportation for you.

An electric locomotive is ready to run as soon as power is switched on—in any kind of weather; without waiting for steam or cranking a cold motor. "Just turn the handle."

The smooth accelleration of an electric locomotive increases the drawbar pull and also reduces the cost of pit car maintenance, because of the ease in starting.

An electric locomotive can be so designed as to be particularly adapted to special or unusually severe conditions. It is because of this adaptability to suit the work exactly that results in big savings in maintenance costs.

In one quarry using a Goodman electric locomotive, not one cent was spent for repairs during the first three years.

80

GOODMAN MANUFACTURING COMPANY
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The Auto Truck Scale that stays accurate

The only scale that will safeguard you against the heavy losses of inaccurate weighing is the scale that not only is accurate but stays accurate.

There is never any question about the accuracy of the Fairbanks Type "S." The principles of design employed in this scale were first proved in railroad track scale service—the heaviest, most withering service that a scale can he subjected to. Its record of unvarying accuracy in railroad service was again repeated under the trying conditions of large capacity grain hopper scales, and now this firmly established principle is setting new standards of accuracy in the Type "S" Auto Truck Scale.

Still more important, the use of rust-proof moving parts and precision in every construction detail assure absolute accuracy throughout the unequaled life of the scale.

Our representative will be glad to give you facts and figures. Or mail the coupon for the interesting book, "A Talk on Scales."

FAIRBANKS SCALES

Chicago, 900 South Wabash Avenue

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And forty other principal cities, each with a service station

The coupon will bring this booklet full of scale information which every scale owner should have.

(Mail to office most convenient)

Fairbanks Scales, Dept. S-B-9,
900 South Wabash Avenue, Chicago.
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Please send your booklet, "A Talk on Scales," also Type "S" specifications and full information about the economy of Type "S" Scales in weighing motor trucks.

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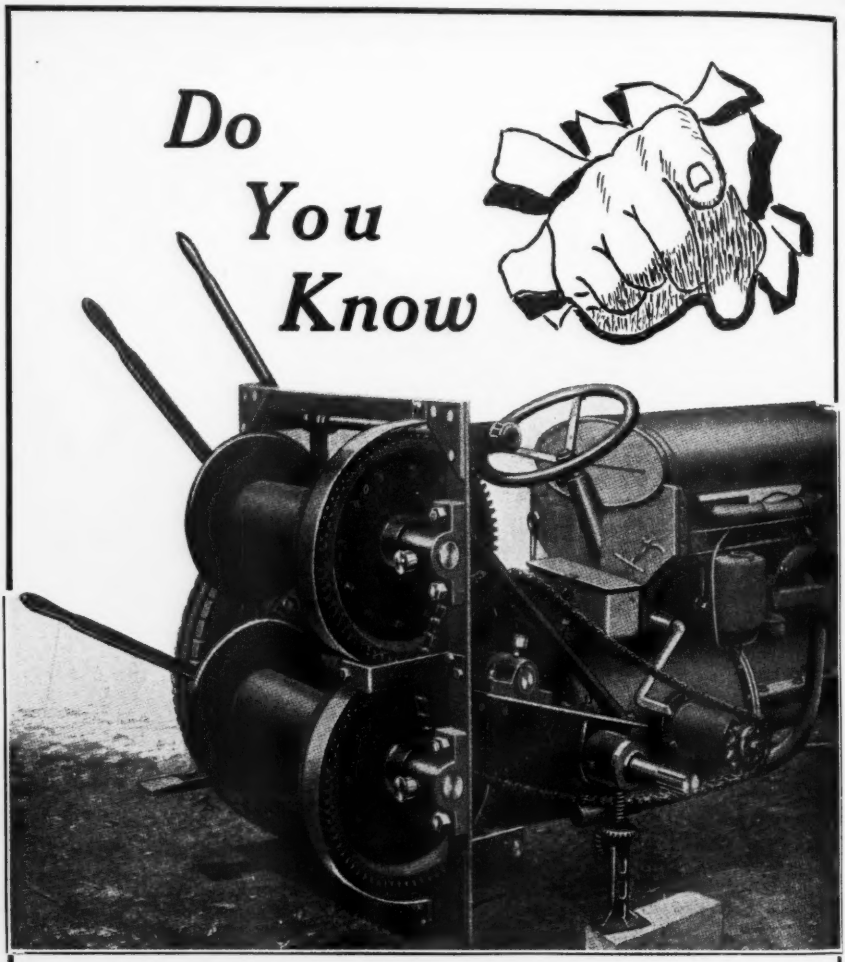

That Continental Winches Are Trouble-Proof?

And are made in two types—friction drive and gear drive, also two sizes—single and double drum.

The friction type is used extensively for loading logs, heavy timbers, and any other heavy objects that require careful handling or speedy operation. It is especially adapted for dragline scrapers, and when mounted on the Fordson Tractor, it makes a most complete, and economical unit.

The powerful brakes which control the drums are operated with convenient foot levers, excepting the top drum on the double drum type, which is operated by hand. Each drum is equipped with ratchet and pawl, so that the load may be held in suspension without using the brake. Speed ranges from 60 to 200 ft. per minute on all lines. Every Continental Winch is unconditionally guaranteed against defective workmanship and materials. Defective parts replaced F. O. B. Memphis without charge.

UNIVERSAL EQUIPMENT CO., Inc.

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Free Service to our readers

For the convenience of readers who are in the market for equipment, our "Free Service" department will furnish on request any information, catalogs and prices on any machinery, equipment or supplies used in pits and quarries. The coupon below makes it easy for you. Simply check, sign and mail.

Pit & Quarry, Rand McNally Bldg., Chicago, Ill.

Pit and Quarry, Research Department,
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WE ARE IN THE MARKET for the items checked below, and would be glad to receive catalogs, prices or other information.

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- ☐ Crushers, Jaw
- ☐ Derrick Swingers
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- ☐ Dippers
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- ☐ Draglines, Revolving Boom

(Continued on next page)

- ☐ Dragline, Scraper
- ☐ Dredges, Dipper
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- ☐ Scales, Automatic, Conveyor
- ☐ Scales, Track
- ☐ Scrapers, Power
- ☐ Scrapers, Team
- ☐ Screening Equipment

(See other side)

- ☐ Screens, Perforated Metal
- ☐ Screens, Rotary
- ☐ Screens, Vibrating
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- ☐ Separators, Gypsum
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- ☐ Separators, Sand
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- ☐ Track
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- ☐ Trucks, Electric
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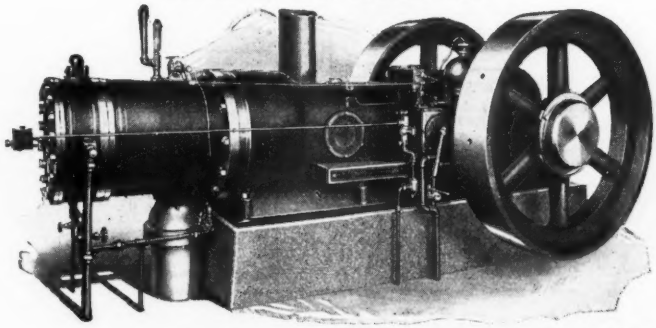

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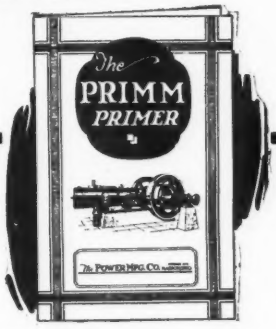

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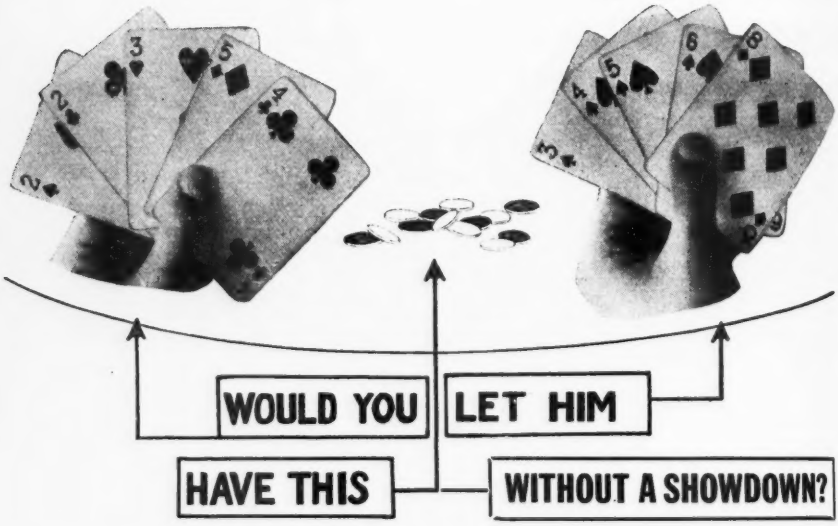

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Pit and Quarry

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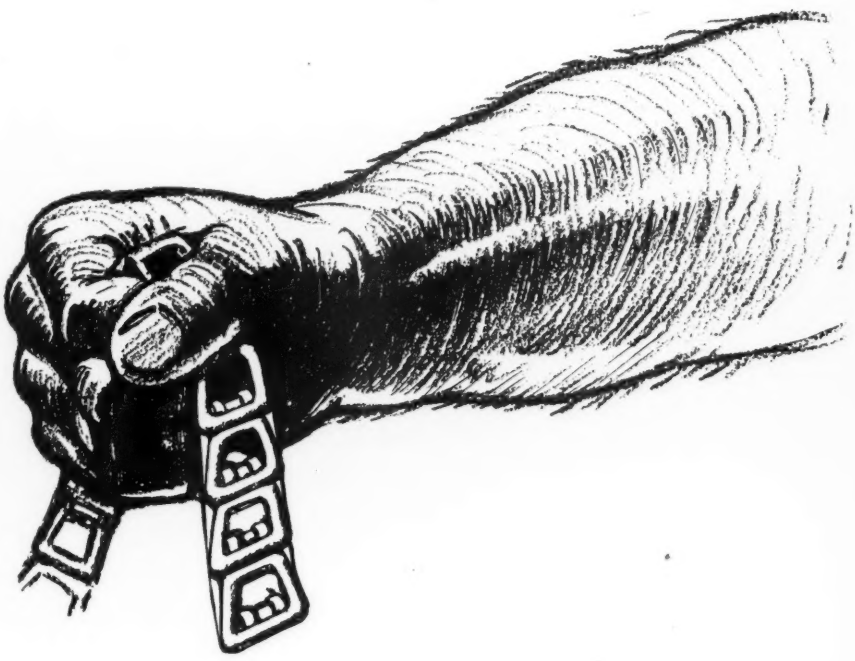

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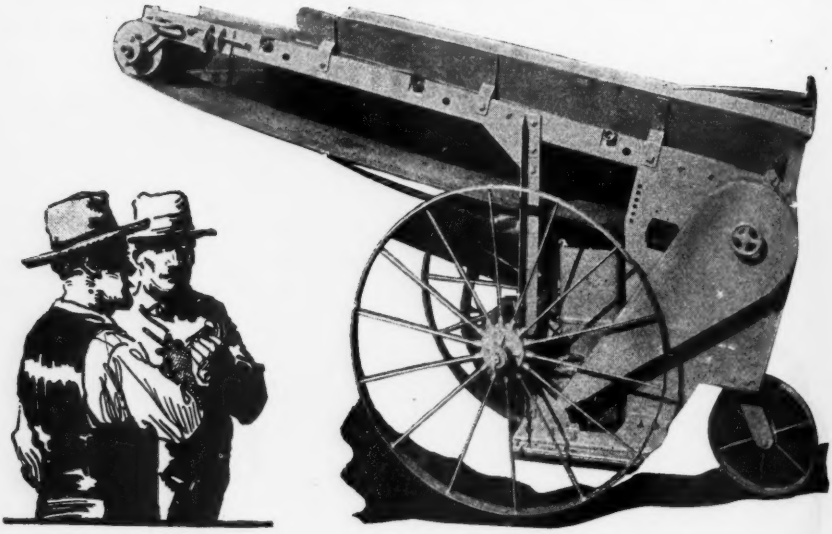

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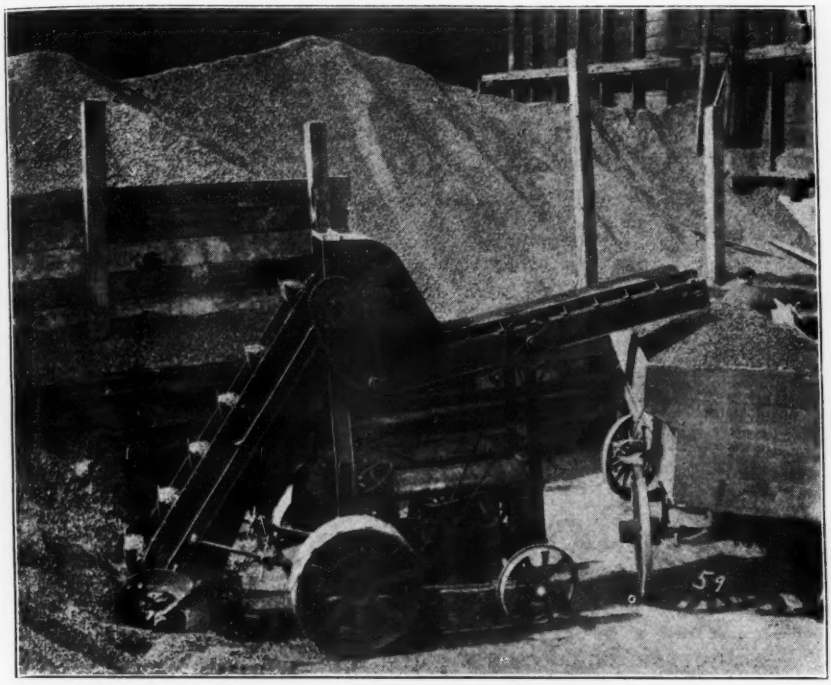

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It was another Thew, because——

Well, you know why.

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Thew Lorain Shovels

Dig Faster—Last Longer

Pit and Quarry

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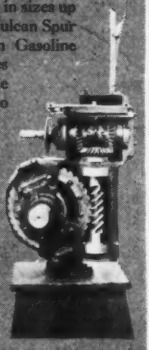
The Worm Gear Drive is an *exclusive feature* of the Vulcan Gasoline Locomotive.

Since this worm-driven type was placed on the market (four years ago) *no replacement* on the transmission or drive has been needed for any in service. Its saving in maintenance cost plus its saving in fuel alone has, in many instances, paid for its initial cost.

Vulcan Worm Gear Driven Gasoline Locomotives are available in sizes up to 12 tons. Vulcan Spur Gear Driven Gasoline Locomotives are available in sizes up to 30-tons.



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INCORPORATED
BETHLEHEM, PA.
Dec. 15, 19
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Wilkes-Barre Pa.
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Answering yours of December 12th:
Our reason for preferring Vulcan
gasoline locomotives is that they are perfectly reliable -
practically always ready to work and very powerful. We find that
our 6-ton four-speed gas locomotive will pull more loaded cars
up a hill than our 9-ton steam locomotive.
Secondly, in case of repairs being needed
quick and reliable service is given by the Vulcan people.
Yours very truly,
H. DENBURGER CONTRACTING CO.
President & Treasurer.
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CONTRACTING CO
BETHLEHEM,
PA

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Statements such as this coming from users of the Vulcan Geared-type Gasoline Locomotives explain, in part, the increasing popularity of these little engines for contracting work, for haulage around steel plants, for quarries, mines and wherever locomotives under 30-ton capacity are usable.

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GASOLINE LOCOMOTIVES

Pit and Quarry

A Semi-Monthly Publication for Producers and Manufacturers of Sand, Gravel, Stone, C ment, Gypsum, Lime and Other Non-Metallic Minerals.

VOL. 10 CHICAGO, ILL., SEPTEMBER 1, 1925 No. 11

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Pass it on

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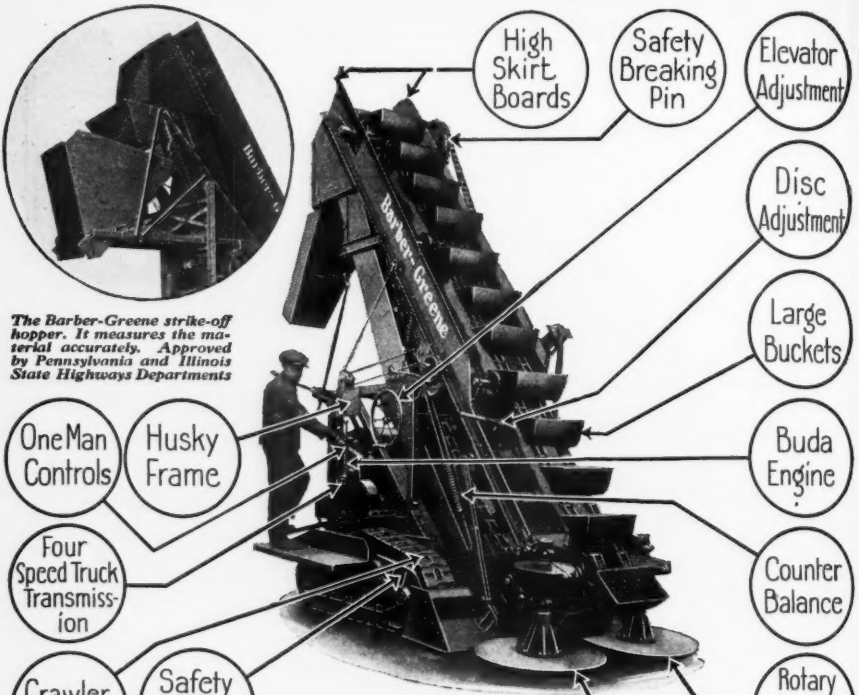
The Barber-Greene strike-off hopper. It measures the material accurately. Approved by Pennsylvania and Illinois State Highways Departments



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Besides loading and batching Barber-Greenes are being swung more and more into such tough jobs as sub-grading and excavating.

The disc feeds can be set accurately to various depths and angles. They leave a smooth, true grade behind them.

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The fact that Barber-Greenes have handled tough digging and loading jobs successfully indicates the sturdiness of their construction. The new Barber-Greene floating boom makes this resistance to strains and wear even greater.

We know of at least twenty different uses for this Barber-Greene. They are illustrated by actual job pictures and data in our new booklet, "Contracting with Barber-Greenes." If you do any loading work at all, this booklet with its accurate information may show you the way to lower costs. Send for a copy. It's free to those interested.

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Representatives in fifty cities

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Portable Belt Conveyors — Self Feeding Bucket Loaders

Coal Loaders . . Automatic Ditch Diggers . . Coal Feeders

Pit and Quarry

Vol. 10 Chicago, Ill., September 1, 1925 No. 11

Some Suggestions Concerning Management

CONTACT with leaders in the non-metallic industry affords us unusual opportunity to study the various types of executive and to reach definite conclusions as to which types are most certain to be successful. Such an opportunity presented itself recently when two producers happened to drop into the editor's office at the same time. The conversation drifted into a discussion of certain men who have succeeded and others who have failed. The reasons for the successes and failures were attributed largely to the varying ability of these executives to determine what not to do as well as what to do. It is easier to follow a law stated positively than to give full credence to one stated negatively. The discussion mentioned dealt entirely with the things one should not do. Some of these principles of inhibition are of so practical a nature that we pass them on.

Do not fail to forecast the future. The first executive whose methods were discussed is one who does not realize the importance of financial forecasting. He has failed to look ahead carefully, logically, and scientifically. In his organization there is no budget. When purchases are made, the first information which reaches the treasurer is the invoice for payment. Perhaps he is prepared for the payment and perhaps not. There is no intelligent connection between the head of the sales and the head of the manufacturing end of the organization. There is no rational connection between costs and the books. There is a tragic need for the expert cost accountant to straighten out the tangled affairs of the organization and to establish a budget control of a graphic nature. The head of this organization does not know that the stability of a business depends on his ability to prophesy as well as on his success as a producer.

The second principle which was discussed was also stated negatively. Do not fail to study the economic factors which affect your business as well as industry in general. A certain case was mentioned of an executive who fails to take into consideration economic laws regarding when to buy and what to pay, and when to sell and what to ask. In his plant he adds new equipment, makes major improvements and brings out new products in periods of high prices, slow deliveries and labor scarcity. In dull times he postpones making replacements until a later time when there will be more money. Of course, when that time arrives, he finds that prices are high. During a period of depression he would be wiser to go ahead with a normal force while labor is plentiful and prices low. His product is standard and will be in demand later when the profits will offset the carrying charges on the production. During the time of slow selling much could also be done in the way of improvement, rearrangement, experiment on new products, and building new equipment. What his business needs is a sound price which bears a scientific relationship to economic fact. To ascertain that price is one of the greatest problems of all industry.

A third weakness found in many organizations can be traced to the executive's attitude toward his own job. There is the man who attempts to carry the entire load himself. He decides all matters of consequence for his subordinates; he attends to a thousand minor details himself; he signs requisitions, inspects every matter of importance personally. He enjoys the satisfaction of believing that he keeps everything in his own hands. He is an old man at forty-five, and either dead or a wretched invalid at sixty.

When a certain producer recently

discovered that he was drifting into this kind of an executive, he suddenly took inventory of himself and his methods and obeyed the order, Do not be the do-it-all-yourself type of executive. The results of his procedure are interesting. He appointed minor executives and placed definitely specified authority upon each. He is sharp and stern when things go wrong and appreciative in practical ways when they go right. He has relieved himself of all unnecessary details. Being a good judge of men, he has selected good leaders for the various parts of his organization. The result is that he is entering his fifties with ideal conditions ahead. There is time for recreation, for enjoying his home, for more than a mere acquaintance with his family. There is time for thinking out plans for the future of his business, for studying conditions in the industry, and for giving some service in solving the problems of the industry as a whole.

It is almost unnecessary to add that the yearly profits of this executive's business have increased in proportion to the changes which were effected in the management. When this producer gathered around him an organization of men who were given freedom and authority to get results, he soon made an enlightening discovery. His subordinates were more competent in their own parts of the business than he was. At first the fact was annoying. He had enjoyed taking care of the details. However, he had seen himself becoming the "household drudge" of the organization and rescued himself before it was too late. The fact that he could select a man to put in charge of an operation who could handle it better than he himself could soon appeared in its proper light. It was his job to find that man and to give him the authority and confidence necessary for his success. To select the man and to see that he produced results was more important to the success of the business than to do the work himself.

There are, no doubt, many cases of men who have built up a business from small beginnings who know little about delegating authority to minor executives. These men have themselves been workmen; they have, through the early years of the business, been concerned personally with every phase of the production. They could easily handle it all; production, sales, purchasing, finance, labor, and equipment. Now that the business has grown, they are reluctant to admit that they are not better qualified than anyone else to handle all parts of the organization. They undoubtedly have genius along technical or scientific lines, but they are not salesmen, or cost accountants, or foremen. They are not up-to-date on advertising methods; they do not understand shipping problems and intricate questions regarding traffic conditions. In reality they cannot afford to be without specialists in all departments of their organizations. To attempt to supervise all of these important phases of a modern business is to jeopardize its future.

The outstanding remark of the interview which we are recounting here was in our opinion one made in reference to the producer who so completely revolutionized his methods of being an executive. "He encourages the expression of staff opinion." Perhaps the wisest thing this producer has done is to build up an organization which is advisory, analytical, suggestive and investigative in character. His men study the business at all points. They study their departments, formulate plans, and make suggestions, always with the assurance that the "chief" will listen. Sometimes it is a mechanic who works out a problem or makes a suggestion which brings about increase of production; sometimes it is one of the highest paid employees. In any event the idea is given whatever attention it merits and is useful if only because the man who presented it is a more valuable workman than if his brain were too dull or his attitude too indifferent to result in constructive work. The producer has nothing to lose and much to gain in fostering this interest and goodwill. In the course of a few years he will probably have taken into consideration a great mass of ideas of more or less value, which he "steps down" to a voltage that can be utilized to the advantage of every one connected with the organization including the stock holders.

There is much valuable opinion available among leaders in the nonmetallic industry. Every time two or more producers get together and discuss their various problems there are constructive ideas presented.

The Efficient Material Handling System Of New York City's Largest Distributor

Written Expressly For Pit and Quarry By F. A. Westbrook

RETAIL distribution of any product is always something of a problem, sometimes a very serious one; and when it comes to the distribution of such heavy and bulky materials as sand, gravel and crushed stone in quantities commensurate with the construction requirements of New York City, a very real problem must be faced. Competition is keen, and unless the materials are efficiently handled, no great measure of success in this line of business is possible.

The Colonial Sand and Stone Company, 643 West 50th Street, New York, is the largest dealer in these materials in the city. An idea of its present size is suggested by the fact that it has 100 motor trucks in service and, on the average, delivers about 5000 cubic yards of material daily. The company does not operate any sources of supply but purchases its goods at wholesale and sells at retail.

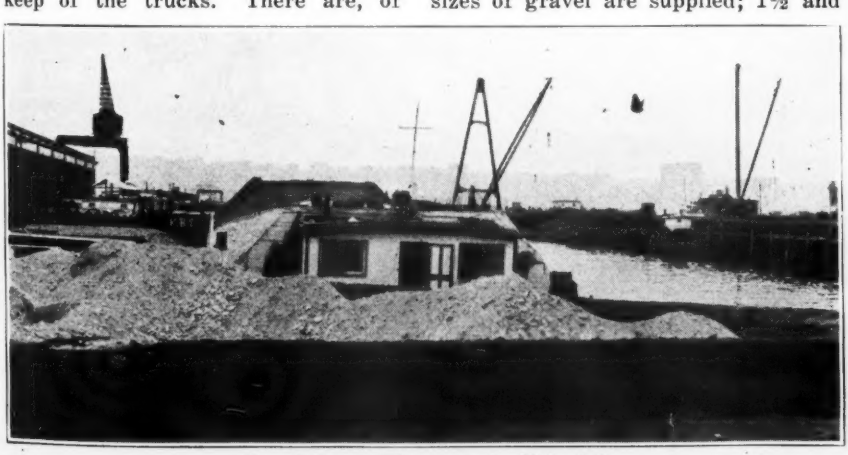
Aside from selling, their problem is to receive and deliver with the greatest practicable economy. This involves three principal requirements; adequate labor saving equipment for the reception of materials, trucking facilities of sufficient capacity to handle the business, and the organization of routines for handling orders in a manner satisfactory to customers as well as for the upkeep of the trucks. There are, of course, numerous other requirements which must be met, but the two last are probably the outstanding features of this very successful and rapidly growing business.

Before entering into a discussion of these two routines, a general outline of the business will be necessary, as well as of interest to those engaged in similar enterprises.

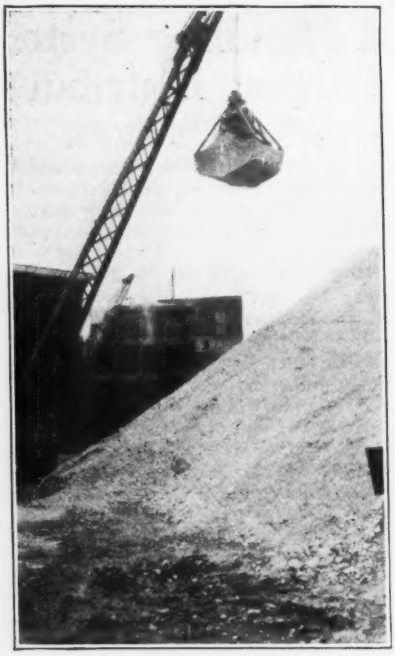
All materials are sent in by water. The company has leased two docks from the City of New York on the Hudson River at 52nd Street and 12th Avenue. The latter, which is the river front street at this point, is very wide and the privilege of using considerable space adjacent to the docks is included in the lease. Canal barges loaded with materials are brought in to these docks. One dock is used for sand and the other for crushed stone and gravel. Separate equipment for unloading the barges and for loading trucks is provided at each dock.

Two kinds of sand are hauled; white steer sand from Rockaway, Long Island, for front brick work, and brown cow bay sand from Hempstead, Long Island, for all rough brick work and concrete. The latter is used in much greater quantities than any of the other materials handled by the company.

Two sizes of crushed stone and two sizes of gravel are supplied; 1½ and



Gravel Barges Waiting to be Unloaded

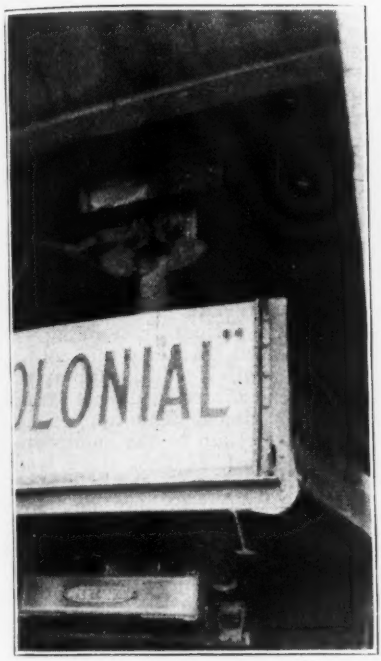


Tractor Shovel About to Load Motor Truck

Derrick and Bucket for Unloading Sand Barge

¾ inch, the former for heavy pier work and the like and the latter for the exposed sides of buildings, etc. The crushed stone comes from the Tompkins Cove district along the Hudson River and the gravel from Hempstead, Long Island. The sand and gravel from Hempstead are purchased from Goodwin and Gallagher and the crushed stone from the New York Trap Rock Company.

Unloading Sand from Barges by Means of a 2 Yard Bucket Operated by Hoist



A Truck Loading at Sand Hopper

Detail of Chute for Loading Trucks with Sand

Sand is unloaded from the barges at one of the company's docks by means of a stationary Lidgerwood steam hoist and derrick with a 100 foot boom equipped with a two yard bucket. This is used for keeping the 5 sand hoppers, used for loading trucks, full and for piling up surplus adjacent to them. The reason for the long boom is to make it possible to pile up sand over a considerable area

Unloading Sand from Barges

around the hoppers and to pick it up again when needed. The white sand which is not used in very great quantities is usually kept in a pile near the hoppers and loaded directly into trucks from the pile by the hoist and bucket.

Gravel and crushed stone are taken from the barges at the other dock by means of an Osgood steam shovel equipped with a 1½ yard bucket and caterpillar traction. The reason for using a tractor shovel for the crushed stone and gravel is because four different kinds of material are handled at this point, and it is impracticable to provide hoppers, largely on account of space limitations, for all of them of sufficient capacity to provide much of a reserve supply. In fact there are only three hoppers for loading trucks with stone and gravel. It is thus necessary to have large reserve piles of these four materials adjacent to this dock and covering a larger area than could be reached by a boom of practicable length. The tractor shovel, therefore, furnishes a very practical means of reaching the various piles of material and loading them either directly into trucks or hoppers. When an order of sufficient size for any one of these materials comes in, a hopper is filled from a barge, if one of the latter with the proper material is available, or from one of the piles, to facilitate loading the trucks; but if the order is just for one or two truck loads and there is none of the specified material in a hopper at that time, the trucks are loaded by the tractor shovel.

An average day's business for the company is about 4000 yards of sand and 1000 yards of gravel and stone combined. This means unloading at least seven barges a day which, on the average, carry about 700 yards. As a matter of fact large reserve piles of materials are accumulated during slack periods in building construction so as to keep the hoisting apparatus available, in so far as possible, for the direct loading of trucks during busy times. This applies more to the gravel than to the sand, for of the latter most of that used is the brown cow bay sand which is loaded into the hoppers all day and is as quickly drawn off. Nevertheless reserve piles of all materials are kept on hand so that building operations in the city will not be tied up in case of interruptions in deliveries to the docks; due, for instance, to heavy fogs on the river, ice, etc. In midsummer, naturally, when building is in full swing, the reserves are much lower than in early spring. Sand and gravel, coming from Long Island, can be accumulated during the winter because ice conditions are never bad

Tractor Shovel on Dock Unloading Gravel

enough to interfere with water traffic for any considerable length of time. Good reserves of these materials may therefore be accumulated during this season in readiness for the opening up of the spring building activities. In regard to the crushed stone, which comes from up the Hudson, there is usually a period of two or three months when the river is frozen above New York and therefore unnavigable. This must of course be taken into account in building up reserves of crushed stone.

As an example of the magnitude of some of the company's orders, it has just signed a contract for furnishing all of the materials for the construction of six miles of new subway from Columbus Circle to 173rd Street and Fort Washington Avenue.

To make delivery of 5000 yards per day requires both organization and equipment. The equipment consists of 100 six yard Pierce-Arrow trucks which are kept constantly on the road. Fifty-three of these trucks were new on June 1st. These are equipped with Heil hoists and six-yard Heil steel-lined wooden bodies. This style of body is particularly well designed to withstand the shock sustained in hopper and shovel loading. The load is quickly discharged by the Heil twin cylinder hoist in less than half a minute.

The investment involved in such a number of high class trucks is, of course, such that the most careful organization and routine is necessary to prevent undue deterioration and to reduce lay-ups for repairs to a minimum. The appearance of 100 trucks constantly traveling through the streets is also of sufficient importance in producing a favorable impression to warrant the greatest care and attention.

There is a force of 15 men at the docks to handle the unloading of barges and the loading of trucks as follows:

2 engineers for the two shovels,
2 firemen for the two shovels,
5 men at the five hoppers, one each, for controlling the flow of material into the trucks,
3 men similarly for the three gravel hoppers,
2 men to work on the barges during unloading and to trim the boats,
1 blacksmith to repair shovels, etc.

The docks are in charge of Mr. Rocco Jacovina. He is the one who instructs each truck driver, as he returns empty from making a delivery, with what to load up again and where to take it. He keeps the necessary records and carefully watches the

Sand Barges Waiting to be Unloaded

TELEPHONE COLUMBUS { 1409 / 1410 / 1411

COLONIAL SAND & STONE CO., Inc.

SAND, GRAVEL AND BROKEN STONE

643-5 WEST 50th STREET

ORIGINAL New York ..... 192 .....

Sold to .....

Address .....

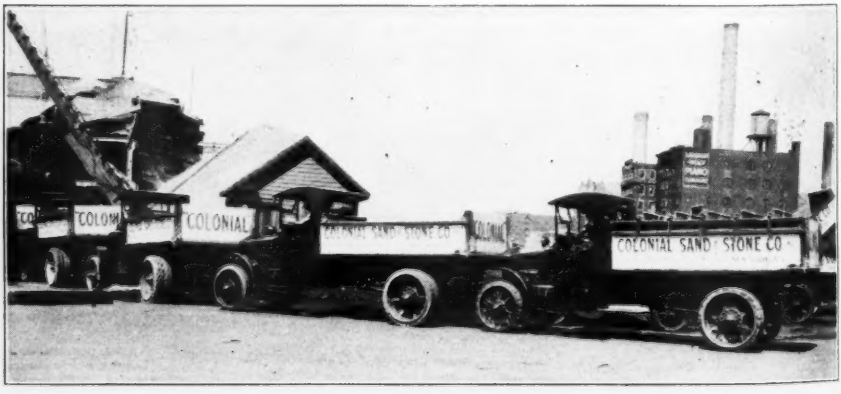
	CU. YDS.	

Signed by .....

TIME LEAVE	A. M.	P. M.	TIME RETURNED	A. M.	P. M.

MANUFACTURED BY AMERICAN SALES BOOK CO., LIMITED, NIAGARA FALLS, N. Y.

Figure 3



Trucks Waiting to Load

trucks as they pass the window of his office to see to it that they are all right. He is the one to keep things moving at this end of the business. It is no mean quality of judgment and brain power which enables him to decide the order of making deliveries by 100 trucks to a great many different building operations in such a manner that a steady and sufficient flow of material is kept up to all customers so as to supply their needs without interruption.

As stated previously the business is on such a large scale that it has been necessary to establish very carefully worked out routines to handle truck maintenance and the dispatch of deliveries. A company owning 100 high grade Pierce-Arrow trucks cannot afford to neglect them in any way which will result in avoidable idleness or undue rapidity of depreciation of the large investment. Thus the two routines are very closely tied together in their effect on the business.

Truck Maintenance

Naturally one of the most important factors in determining the life and performance of the trucks is the character of the drivers. Consequently great care is exercised in their selection. New men are carefully looked up, and in so far as possible friends of old drivers who have proved themselves to be satisfactory are employed. Each applicant is also given a day's driving test with one of the trusted old timers on the seat beside him. If the result is in any way unfavorable, the man is not taken on. Furthermore, a card record is kept of each driver on which are entered the usual data, including all accidents or mishaps, with comments. Mr. Jacovina also watches the men

"SAFETY FIRST PAYS"

CAR NUMBER .....

DATE ..... CHAUFFEUR .....

CHECK IF THE FOLLOWING SUPPLIES ARE NEEDED

GASOLINE		OIL		WATER	

CHECK THE FOLLOWING PARTS THAT NEED ATTENTION

BUMPERS AND LICENSE PLATES		BATTERIES AND CABLES	
LIGHTS		TRANSMISSION	
RADIATOR		UNIVERSAL JOINTS	
FRONT AXLE		DIFFERENTIAL GEAR AND CASE	
SPARK		BRAKES	
CARBURETOR		SPRINGS AND FRAME	
VALVE ADJUSTMENT		TIRES AND CHAINS	
CARBON		BODY AND CAB	
IGNITION CIRCUIT		LOOSE OR WORN PARTS	
WARNING DEVICE		RADIUS RODS	
STEERING GEAR		TORQUE ARMS	
CLUTCH		RUNNING BOARD AND FENDERS	

REMARKS

.....

.....

.....

REPAIRMAN .....

DATE .....

THIS REPORT IS TO BE USED IN REPORTING DEFECTS NOTED BY DRIVER AND SHOULD BE TURNED IN WHEN CAR IS RETURNED TO GARAGE.

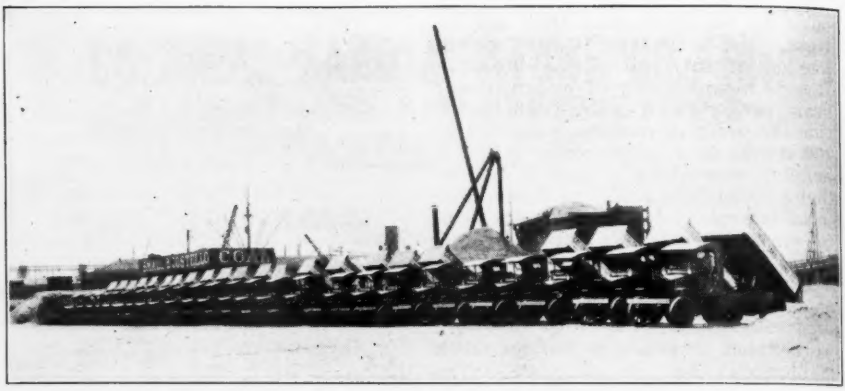
Figure 1—Form Filled Out by Truck Driver When He Thinks Something Is Wrong

DAILY REPORT OF DELIVERIES

NEW YORK, ... 192

DRIVER			TIME	NO. LOAD	TRUCKING	Sand	Stone	Gravel	Grit	Dirt	Mixture

Figure 2



Part of the Truck Fleet

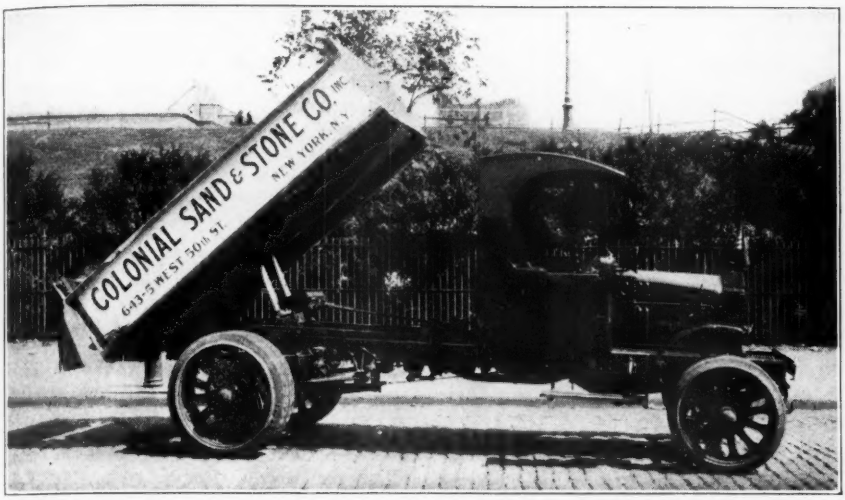
as they come and go, and notes the time they take to make deliveries on the "Material Ticket" explained later.

So much for the human element. We shall next consider mechanical details. The company maintains two garages with a complement of mechanics in each. As a matter of routine all the trucks are greased and inspected every Wednesday and Saturday. This, of course, reduces trouble to a minimum and brings most potential trouble to light in its incipiency.

Whenever a chauffeur notes any trouble or thinks that something may be wrong, he fills out the blank form shown in Figure 1. This is turned in at the garage. Sometimes the chauffeur waits to consult the superintendent at the docks before doing this, and at other times the superintendent detects something with his practiced eye and tells the chauffeur to turn in a slip.

Realizing the important publicity value of such a large fleet of trucks they make every effort to keep them clean and neat in appearance. Thus all trucks are washed every night.

Truck Waiting to be Checked at Superintendent's Office

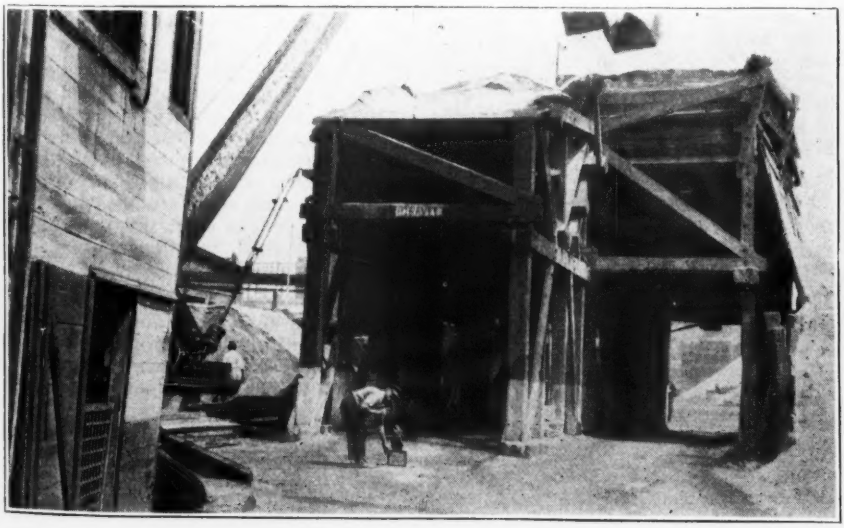


One of the Trucks with Body Raised to Full Dumping Position

Before the old ones were turned in on June 1st of this year, they were painted approximately every two or three months or whenever their appearance called for it. It has not yet been necessary to do this with the new ones, but as soon as the paint becomes at all shabby, they will be attended to. The company's name appears in conspicuous letters on both sides of the trucks, as well as on the tail board and the bumper in front.

In order not to interfere with their daily service the cars are painted on Saturday nights, or on the eve of holidays. In fact by following the careful methods of maintenance described there are seldom more than 3 or 4 trucks at a time out of the 100 in service laid up for repairs.

Another operating practice which is followed in regard to the trucks, and which seems to be a very good one, is that of always putting them up for



A View of the Sand Hoppers

the night unloaded. This is because it is ruinous to the springs to permit the trucks to stand frequently over night when loaded. All trucks are numbered and a card record is kept for each one. On this card are entered monthly, the cost of all repairs and the consumption of gas and oil. It is thus very easy to detect whether there is anything radically wrong with any individual machine or whether its driver may be handling it improperly.

It is felt at present that the most economical thing to do will be to turn in all of the cars after two or three years' service, but of course it is now too early to make an authoritative forecast.

Delivery of Orders

The making of deliveries is controlled by the superintendent at the docks. He is the man to whom the drivers report as well as those who load the trucks and unload the barges. The superintendent, Mr. Jacovina, has his desk at a window from which he gives the drivers their instructions. Orders are received at this point from the office. Those coming in during the day are relayed by telephone and noted in spaces on a chart as shown in Figure 2. When the order has been filled, it is checked off with a red pencil. Other orders, which come into the office too late in the afternoon for delivery that day or orders which come in a day or so ahead of delivery date, are made up in typewritten lists and sent to the superintendent's office so that he has them the first thing in the morning, to start the day's work. These are also crossed off with a red pencil when attended to.

When a driver reports at the superintendent's window, he is told to obtain a load of sand or gravel of a certain kind, and deliver it to a certain address. These instructions are covered by a ticket, made out in triplicate. This form is reproduced in Figure 3. It will be seen that in addition to space for the usual information, such as date, name and address of customer, and nature and amount of material, space is provided at the bottom for recording the time when the driver is given the order and the time when he returns. It is thus easy to check up on the efficiency of the drivers.

The driver is given two of these tickets. One is left with the customer, and the other is signed by the customer and returned to the superintendent by the driver. The third ticket is kept by the superintendent and placed on a spindle file. On the superintendent's desk is a series of pigeon holes, one for each truck. When the signed ticket showing delivery is returned by the driver, the superintendent places it in the proper pigeon hole. In this way it is easy to know how many loads each truck and driver have delivered in a day. The tickets on the spindle file also are a useful check against those in the pigeon holes. At the end of each day all tickets are turned in to the office for accounting purposes. Furthermore, by checking against goods received they make it possible to keep a perpetual inventory.

Of course all drivers are expected to return as quickly as possible after making a delivery. The superintendent then dispatches them with another load to another customer, following an order of preference depending on advice from the office or his own knowledge of customers' requirements.

In those cases where overtime work is in progress and materials must be delivered after regular working hours, an extra charge is made. This practice is not encouraged, but every effort is made to give the best service practicable to the building industry.

When materials are received on the barges, they are accompanied by tickets, or invoices, more or less similar to those which are sent out to customers with the trucks. In this case, however, one of the company's men is detailed to measure up the amounts with the barge "captain."

Some materials are sold to other retailers who send in their own trucks to be loaded at the colonial Sand and Stone Company's docks. This, however, is only a very minor portion of the company's business.

The officers of the Colonial Sand and Stone Company include L. Ruckeyer, president; Jenerose Pope, secretary-treasurer; S. Weinberg, manager, and Rocco Jacovina, superintendent.

Reclaiming In the Cement Industry

Written Expressly For Pit and Quarry By C. H. Sonntag

STORAGE of materials between operations in a mill of the size of the average cement plant is practically necessary to prevent interruptions to the working schedule that would result in loss of output. The departments of the mill are in a sense separate manufacturing units, each taking material from the one preceding it, doing its allotted work on it and passing it on to the one next in succession. If there were no storage between these various departments, efficient operation of the mill as a whole would demand a continuous performance from each component part. This is, of course, a mechanical impossibility, and so material storages are provided as equalizers to care for the inevitable shut-downs.

Storage and its accompanying reclaiming arrangements may also serve other purposes. Following the quarry, it will care for times when that operation will be idle because of adverse weather conditions. If raw material is brought in by public carrier or by barge or boat, storage will compensate for the irregularities of delivery that will occur sooner or later. If the raw materials are of variable composition, a properly arranged storage and reclaiming system will be very effective in evening up the changes in chemical analysis. In the case of clinker, storage increases its grindability, improves its quality, and compensates to a considerable extent for irregularities in mix control and burning. Storage of cement is the only way to compensate for the seasonal demand, as well as acting as a further mixer and blender.

In a more detailed consideration of the subject it will be well to discuss first the various materials that are stored and reclaimed in cement mills, together with methods of reclaiming, and later some of the devices that are or may be used in this work will be taken up.

Limestone

This is ordinarily crushed to mill feed of about 1½ inches before storage, which may consist of a circular conical pile resulting from constant dumping from one point or a long pile such as would be made by a traveling belt conveyor tripper on an overhead bridge. If these piles are built up on ground on which no provision for reclaiming has been made, this must be done above the ground level. Commonly the locomotive crane with grab-bucket is used for this, with the so-called portable loader as an alternative. The crane, if mounted on standard gauge railroad trucks, can be used for handling other materials around the plant, for emergency switching of cars, and on jobs not requiring a bucket. On the other hand it is high in first cost, and requires care in operation and repairs if it is to continue to give satisfactory service.

The portable loader is a much cheaper machine, and if the rock is to be loaded into railroad cars, as is usual with this type of storage, it presupposes that some means of keeping the cars close to the pile is arranged for. The reason is that while the locomotive crane with 50 foot boom may work with an effective radius of 40 or 45 feet, the portable loader does not have such a range of action in one unit. Nevertheless there appears to be field for this machine, for it does not represent a large investment, and the crane, if the plant has one, can probably be profitably used elsewhere. As the tonnage of stone used in the average cement plant is quite large, this should be borne in mind when buying a portable loader. A machine of this type may be combined with one or more portable conveyors and stone carried quite a distance.

Rock may also be stored in bins, but there is an economic limit to this set by the cost of the bin. Such storage is commonly used when the rock is to be spouted into cars, the bin really acting as an equalizer between crusher output and car supply.

Where very large tonnages are to be handled, it is best done by bridge cranes and grab-buckets. They range in size from the small ones of 40 or 50 foot span to the huge machines used on the limestone docks in Michigan. These are an adaptation of the "ore bridges" used in unloading iron ore from steamers at the lower Lake ports, and later reclaiming from the storage piles built up under the bridges. This type of machine has

the advantage that the rock may be spread out into a flat pile. and with proper control segregation of the coarse rock from the fine may be largely avoided. This is of advantage in cement mill practice, as the fines usually contain less calcium carbonate than the lumps.

Stone may be stored and reclaimed by the slack cable scraper conveyor, which will be considered under coal handling, and also by the hammerhead crane, which will be discussed under clinker storage.

Instead of depending on surface reclaiming devices, the stone pile may be built over a tunnel in which there is a conveyor to which the rock may be fed. The tunnel usually has its top flush with the ground surface, and is made of concrete. The conveyor may best be either a belt, drag chain or a pivoted bucket carrier. The latter is much more expensive than the others, and its installation is warranted only under special conditions. The choice will in most cases be between the belt and drag chain, though the belt is capable of handling more material, and will have that advantage when large quantities are involved.

Any tunnel convevor should have a uniform feed. Although there are other devices that will do this work, the use of the reciprocating plate feeder is almost universal. A number of these may be mounted under the roof of the tunnel, and as many put in operation as conditions warrant.

A typical form of plate feeder is shown in Figure 1. It consists of a pan moved back and forth under the feed opening by means of an eccentric. The rate of feed may be changed by altering the throw of the eccentric, which has a double center permitting this adjustment, and by changing the speed of the eccentric shaft. It may also be done by varying the thickness of the stream of stone going over the feeder by adjusting the setting of the slide gate in the front plate of the hopper. The particular machine illustrated is intended for individual drive, but where a number of them are mounted in the roof of a tunnel, they may all be connected to a reciprocating bar running the entire length of the conveyor and actuated by an eccentric that receives its motion from the conveyor drive.

Reclaiming in a tunnel is sometimes done by means of a car which may be moved along under the different openings, which are provided with individual gates. This is a good method when two or more materials such as rock and shale are piled at different points over the tunnel. The car may then have a hopper scale mounted on it and the mix be made at this point. This arrangement has been used in several mills.

A tunnel conveyor under a stone pile will reclaim only about half the contents of the pile by gravity flow. The balance, if needed, must be moved over the tunnel by some other contrivance.

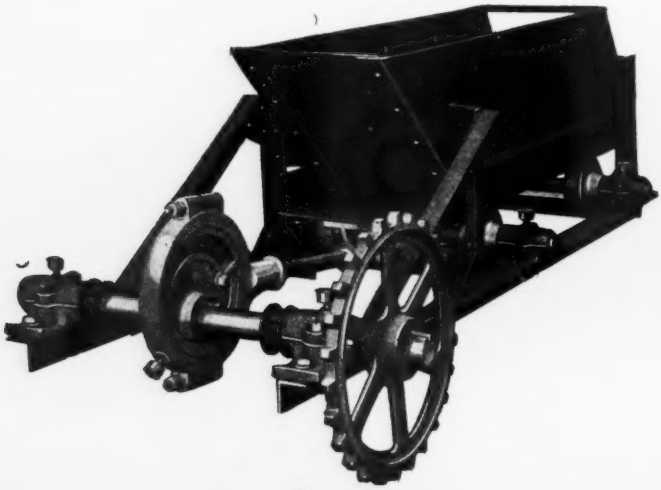


Figure 1

Clay and Shale

The argillaceous constituent of cement will come to the mill as slag, cement rock, shale or soft clay. As the use of slag is confined to the mills of one company, it will not be further discussed. Cement rock is here used as a general term covering any limestone to which more calcium carbonate must be added to make a properly proportioned cement mix. Such stone will be hard enough to handle by the methods described under "Limestone."

Most shales when stored in an open pile exposed to rain will break down and become more or less plastic. Such shales should be stored under cover, and we will probably find them reclaimed by a bridge crane or by a tunnel under the pile.

When plastic clay is stored in a pile, its weight will pack it down until it is just as dense as it was in the bed from which it was dug. Exposure to rain makes this condition worse. Hence reclaiming clay from storage requires powerful digging equipment, and is best done by grab-bucket. Where such clay is to be used in a dry process mill, it will be found wise to provide a storage of dry clay for the ordinary fluctuations of operation, depending on wet storage for extraordinary emergencies only.

Coal

There are a number of ways of reclaiming coal from storage. If it has been piled in the open by a locomotive crane or series of portable belt conveyors, it can be reclaimed in the same way. Many of the remarks made under "Limestone" on this class of equipment will apply to coal reclaiming also. In case the pile develops localized heating, either of these methods will permit the hot spot to be dug out and used. If the pile is conical, the hot spots will practically always be near the edge of it.

Coal may also be stored over a tunnel and be reclaimed by belt, drag chain or pivoted bucket conveyor. The first two are more frequently used. Cement mills commonly buy slack or screenings for their kiln coal, and it seems to be a fact that much of it is wet when it goes into storage and is still wet when taken out. If such wet coal is fed onto a belt conveyor, some of it will stick to the belt and eventually some of it will get on the face of the head or tail pulley and stick there, causing the belt to run to one side and become damaged. This is aggravated by the fact that one does not usually find the best type of labor in the coal tunnel. All things considered, a substantial drag chain will probably be found cheapest for this service in the long run. Feeding to the conveyor is best done by one or more reciprocating plate feeders such as have al-

Figure 2

ready been mentioned.

One very serious objection to the tunnel type of coal storage is that not more than half the coal will flow to the tunnel openings by gravity. There is left a long heap on each side of the tunnel that never moves unless special arrangements to that end are made. These piles are pretty certain to take fire sooner or later, and may necessitate hand work to move them if a crane is not available.

The slack cable scraper conveyor is a device that has been used for storing coal at industrial and public utility power houses for some time, but does not seem to have come into use in the cement industry as much as its merits seem to warrant. It has a number of advantages that should make it a strong competitor of the older methods for handling not only coal, but crushed stone and clinker as well. For one thing its first cost is low. It involves no heavy foundation, no tracks, and very little fixed or permanent construction, which adds to the overhead expense. It drags the coal over itself in such a way as to distribute the fine and coarse particles uniformly. It is well known that a coal pile containing alternate layers of coarse and fine coal is much more liable to spontaneous combustion than one in which the sizes are uniformly mixed. If used for stone storage it prevents segregation of sizes of different chemical composition. About the only objection that can be made to it is that for storing any large quantity it requires considerable ground area, but most cement plants are not seriously hampered in this respect.

Coal may also be stored and reclaimed by bridge cranes as described under "Clinker."

Gypsum

This is a rather peculiar material in that it has the property of packing into a firm mass which will stand up in a vertical wall. Hence mechanical feeders can not always be depended upon to handle it at a uniform rate. It sometimes packs in railroad cars so firmly that it must be loosened with picks before is can be shoveled.

If the mill requirements are such that the inside bins at the point where the retarder is added to the clinker are not large enough, a reserve supply of gypsum may be stored in the open, being handled by a grab-bucket on a bridge or locomotive crane. The moisture that it will take up from rain will not be sufficient to interfere with its use without drying.

Clinker

Some mills grind their clinker as fast as they make it, but most find a storage at this point in the manufacturing process of advantage. As clinker has some little value, the expenditure of more money in handling it without loss is warranted than in the case of rock and coal.

The locomotive crane, the portable conveyor, the bridge crane, the pivoted bucket conveyor, the belt, the hammer-head or pillar crane and the slack cable scraper may all be used in storing and reclaiming clinker, and the choice will be determined by the local conditions and the money available. Since clinker should not be ex-

Figure 3

posed to the weather more than a few months, it is well in designing storage for it to so arrange things that any portion of the pile can be reclaimed without special manual labor. By properly laying out the tracks, the locomotive crane will reclaim everything in storage, and the pile can be extended indefinitely by adding to the track on which the crane runs. For very large storage this is probably the method of least investment. The portable and the slack cable conveyors will also clean up the storage, though the portable will require some labor to move the units around, but neither of these can take clinker from a certain spot in the pile as well as one of the machines using a grab-bucket.

Unless there are retaining walls under both runways of the bridge crane, some clinker will roll beyond the reach of the bucket, and will have to be dragged back under the runway by some other means, but the provision of such walls will permit a crane of short span on high supports to store as much clinker as a longer span machine on a lower runway.

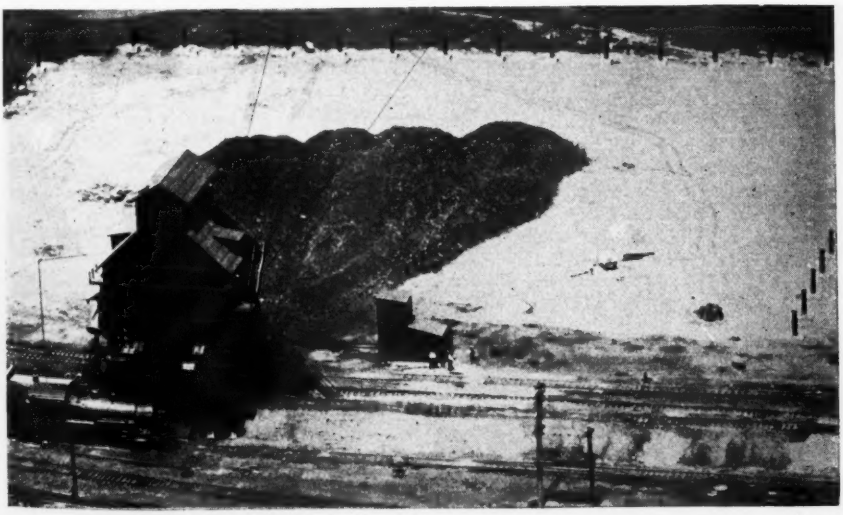
The belt and the pivoted bucket conveyor are subject to the same limitations as when handling other materials—that is, only about half the clinker in storage will flow to them by gravity. The belt conveyor has the additional disadvantage that there is danger of lumps of hot clinker getting on to the belt and damaging it.

The writer does not know of an instance of the use of the slack cable scraper for handling clinker, though there is no basic reason why it can not be so used. There would appear however to be some danger that if hot clinker were being sent to storage the steel cables might be damaged by the heat.

Reclaiming Machinery

Locomotive Cranes

These machines have come into such general use that it hardly seems necessary to treat them very fully here. To handle a 1½ cubic yard bucket at the end of a fifty foot boom requires a crane of about thirty tons rating, and a lighter machine and smaller bucket will not be adequate to the demands that a cement mill will make upon it. If mounted on standard gauge trucks the crane will go anywhere that other railroad equipment will go. Where it is to work only in a limited space, it is sometimes mounted on trucks with a gauge up to eight feet or even more. Such a crane is, of course, much more stable than when on standard gauge track, but its usefulness is circumscribed by its inability to get around freely. The bucket should always be of the two line type, which in turn will call for a crane with two independent rope drums.



A View of a New Coaling Station for One of the Large Railroads

Buckets may be roughly classified as the powerful digging and the quick action types. The former requires considerably more rope to be overhauled in closing than the latter, and as the materials to be handled around a cement plant are always granular, the quick acting bucket should be selected.

Portable Loaders and Conveyors

The loader is a self-contained machine consisting of a power source, a feeding device, and a bucket elevator. Power locomotion is usually provided. Figure 2 shows such a machine driven by gasoline engine, though an electric motor may be used if preferred. The cut shows discharge into a truck, but it may go into a railroad car just as well. This loader has a slow motion for crowding into the pile, and the paddles or blades on the extension of the foot shaft of the elevator are so shaped that they will draw material from quite a distance to where the buckets can pick it up.

When using a portable loader care must be taken to see that the upper part of the pile is kept broken down to somewhere near its natural angle of repose. If this is not done a large amount of material may slide down at once and partly bury the loader.

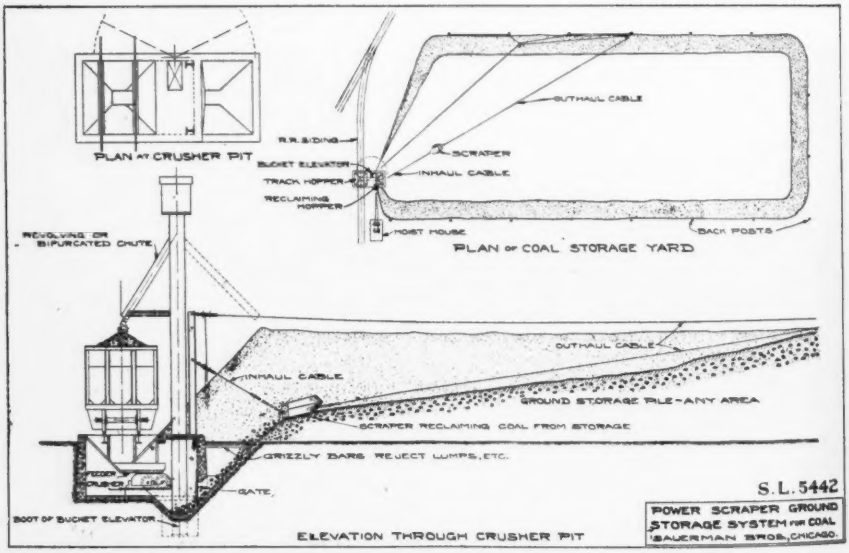
The portable conveyor is, as its name implies, a belt conveyor mounted on a truck, adjustable as to height and slope, and with a self-contained power unit, usually an electric motor. Several of these may be arranged in series, so that transportation over considerable distances is possible and yet the system is very flexible.

Jib Cranes

This is another and perhaps more correct name for what were earlier in this article called hammer-head or pillar cranes. Two types have been used to handle clinker. One consists of a latticed steel mast, guyed at the top and pivoted at the bottom, with mechanism for rotating it about the pivot. A horizontal arm projects from the mast at about the half-way point of its height, and is guyed at several points of its length to the top of the mast. A trolley or carriage travels along this horizontal arm from which the bucket is suspended. A platform attached to the base of the mast and revolving with it carries all the operating mechanism, the power being electricity.

In the other crane of this general type, the central mast has become a steel tower with a wide-spreading circular base carried by rollers on a circular track. The diameter of the base is such that with the assistance of some counterweight the crane with the loaded bucket in its outermost position is stable without guys.

Both of these machines are subject



A Line Drawing Showing the Essentials of a Ground Storage System

to the same limitations as the traveling bridge crane running on an elevated track, that being the fact that if material is piled very high some of it will roll beyond the reach of the bucket.

The Slack Cable Scraper Conveyor

The original device of this type seems to have been developed to excavate sand and gravel from inaccessible bars or from under water, where the expense of more elaborate equipment was not justified. In this form it consists of a heavy cable anchored at one end either at the ground level or to a short post, the other end being connected to the top of a tall mast through multiple blocks by which it may be pulled tight or allowed to become slack enough to touch the ground. It will be evident that when tightened it will be on a fairly sharp incline. On this cable runs a carriage from which is suspended a scraper bucket which may be pulled up the incline by another rope.

Assuming that the bucket is at the top of the incline, release of the tension on the filling cable will permit the carriage with the bucket to run down the main cable until it is near the ground. Slackening of the main cable will drop the bucket onto the material to be excavated. It is loaded by drawing in on the filling rope, and when it is full the main cable is tightened, raising the carriage and bucket clear of the ground. A continued pull on the filling cable will bring the bucket to the top of the mast, where it is dumped into a hopper.

In this form the slack cable excavator has found many applications in sand and gravel pits, but for cement plant use it is of little value because it does not build a stock pile, and also because delivery is at a considerable height. To overcome these objections it has been redesigned by giving up the gravity principle of operation. In the new form the mast is much shorter. The bucket is not suspended, but is always resting on the material being excavated. It may be pulled toward the central tower or head post by one rope and away from it by another which we may call the tail rope. At the edge of the storage heavy posts are set about 20 feet apart and to or between these is fastened a sheave over which the tail rope works, passing back over the stock pile to the head post, from

A Close-Up of the Head Post and Hoisting Engine

which it leads to one of the spools of a double drum hoisting engine. The rope that pulls the bucket towards the head post goes to the other drum. The bucket is reversible so that it may be made to scrape in either direction.

To put material into storage an initial pile must be made by some means, such as a crane or skip hoist, in front of the head post. The bucket may be made to cut into this and drag it away along the ground. If the bucket is reversed it will bring material in from the pile and dump it into a hopper provided near the head post. Stock piles several hundred feet in radius and 25 feet or more high may be built up in this way, the entire operation being controlled by the use of one lever.

From a rather crude beginning the scraper conveyor has developed until it has marked advantages over the older methods in many cases, especially when coal is to be stored. Some of these have been previously mentioned when discussing coal storage. The buckets are made with capacities up to 8,000 pounds, and the complete conveyor using this size bucket will have a capacity of 550 tons per hour on 100 feet haul, using a 200 HP motor. Much smaller equipment than this will be large enough for cement mill use. Where the space needed is available, the scraper conveyor is worthy of very serious consideration when planning a material storage.

Recent Patents

The following patents of interest to readers of this journal recently were issued from the United States Patent Office. Copies thereof may be obtained from R. E. Burnham, patent and trade-mark attorney, Continental Trust Building, Washington, D. C., at the rate of 20c each. State number of patent and name of inventor when ordering.

1,545,621. Dipper for excavating-machines. George E. Turner, New Lexington, Ohio.

1,545,769. Screening surface. Joseph L. Hiller, Mattapoiset, Mass.

1,545,976. Screening apparatus. Morley P. Reynolds, Cleveland Heights, Ohio, assignor to W. S. Tyler Co., Cleveland, Ohio.

1,546,140. Boom-swinging means. Erich H. Lichtenberg, Milwaukee, Wis., assignor to Koehring Co., same place.

1,546,214. Drag-clam. Harris T. Dunbar, Buffalo, N. Y.

1,546,390. Tilting spreading bucket. Erich H. Lichtenberg, Milwaukee, Wis., assignor to Koehring Co., same place.

1,546,791. Scraper-bucket. John W. Page, Chicago, Ill.

1,546,874. Excavating - machine. Daniel J. Walsh, Pittsfield, Mass.

1,547,041. Attachment for power-shovels or dredges. Charles L. Israel, Portland, Ore.

1,547,114. Sand-drier. Charles S. French, Eckman, W. Va.

1,547,385. Rock-crusher. Alvah D. Hadsel, San Francisco, Cal.

1,547,491. Method of and apparatus for crushing coal and the like. Emil Barthelmess. Dusseldorf-Oberkassel, Germany.

1,547,533. Excavator-shovel. Percy H. Thomas. Upper Montclair, N. J., assignor to Guggenheim Bros., New York, N. Y.

1,547,758. Drag-line bucket. Sidney G. Jones, Minneapolis, Minn.

1,548,309. Bucket for placer-dredges. William J. Hall, Chicago Heights, Ill., assignor to American Manganese Steel Co., Chicago, Ill.

1,548,374. Excavating-teeth. Walter J. Mullally, Chicago Heights, Ill., assignor to American Manganese Steel Co., Chicago, Ill.

1,548,375. Bail-ear for excavating-buckets. Walter J. Mullally, Chicago Heights, Ill., assignor to American Manganese Steel Co., Chicago, Ill.

1,548.376. Excavating-bucket bail-ear protector. Walter J. Mullally, Chicago Heights, Ill., assignor to American Manganese Steel Co., Chicago, Ill.

1,548,971. Rock-separator. Adam Ziska, Jr., Milwaukee, Wis., assignor to C. F. Burgess Laboratories.

1,549,508. Clamshell-dredge. Arthur W. Robinson, Upper Melbourne, Quebec, Canada.

1,549,538. Clamshell-bucket. Edward L. Harrington, Erie, Pa., assignor to G. H. Williams Co., same place.

1,549,555. Crushing apparatus. Olav E. Jorgensen, Forest Hills, N. Y., assignor to Allis-Chalmers Co., Milwaukee, Wis.

1,546,641. Gyratory crushing-machine. William S. Weston, Columbia, S. C., assignor to Weston & Brooker, Engineers. same place.

A Haiss "Creeper" Loader

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You men who sell and deliver bank run sand and gravel are in line to earn a bigger profit on your operation. *Cut down the labor cost of loading and speed up your trucks' get-away.* It doesn't take a steam-shovel pocket book to buy a Haiss Loader.

And that same Haiss Loader will dig and load 2 yards a minute, with only one man (the machine operator). The big 37 H.P. Waukesha motor gives the buckets power enough to dig in any average bank—and the Haiss Feeding Propellers (patented) pick and loosen the material and push it in front of the bucket.

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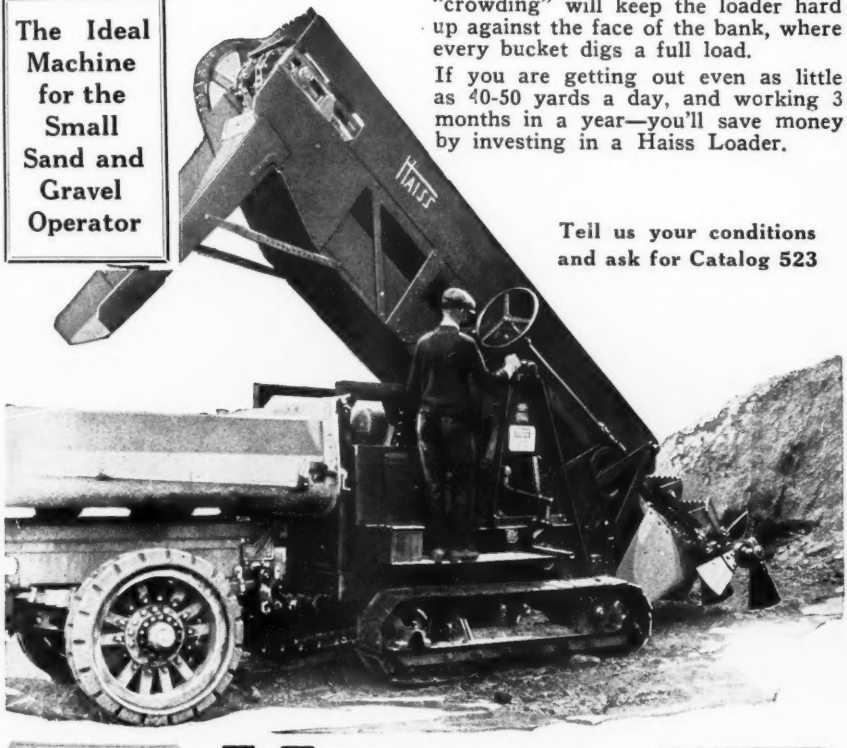

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One of these Plymouths has been in use 18 months; two 12 months and two for six months.

Repeat orde[r] the sto[ry] fornia, from [A]ta to the quarryma[n] rite.

THE F[A]ROO
Ply[mouth] Locor
[P]LYMOUT[H]

PLYM[OUTH]
Gasoline [Locomotives]

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Incorporated
OCALA, FLORIDA

August 11, 1925.

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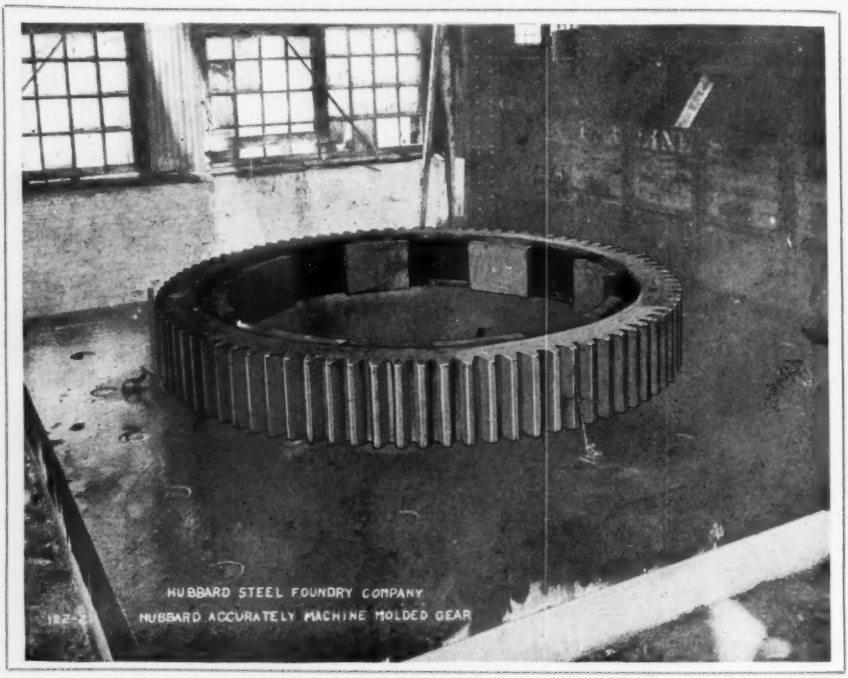

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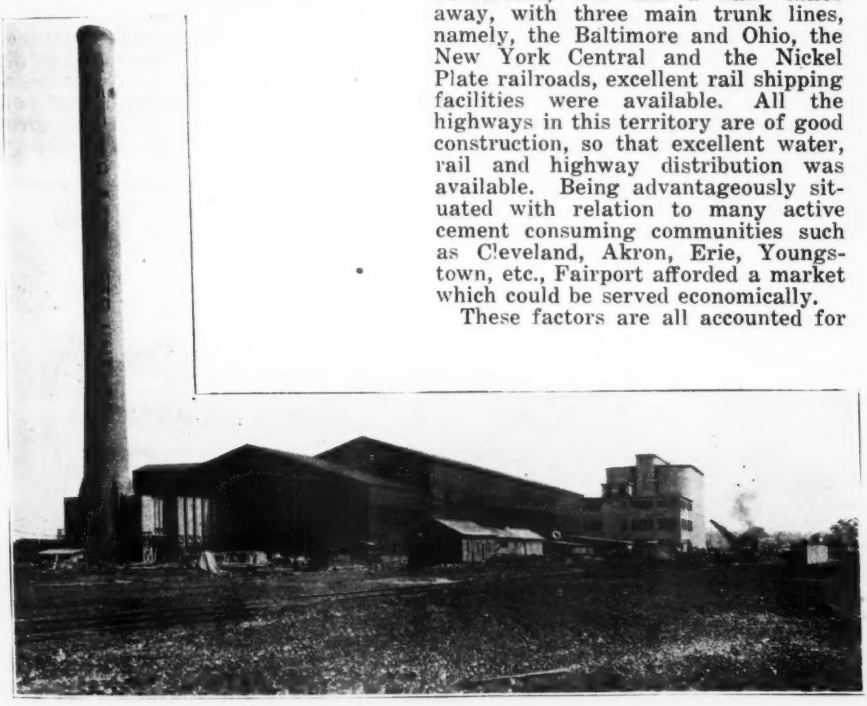
New Features of Engineering Design Applied to Latest Cement Plant

Standard Portland Cement Plant at Fairport, Ohio, Completed Excellent Location With Splendid Facilities for Shipments

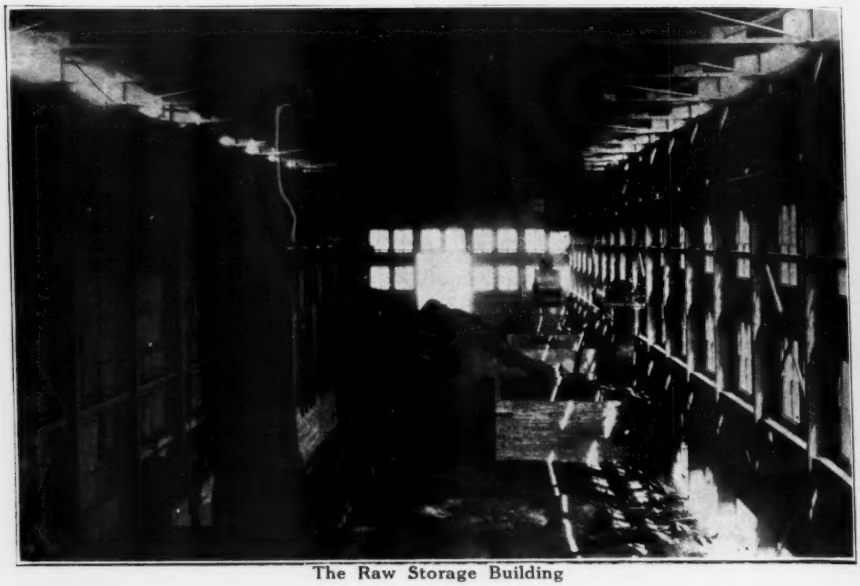
CONDITIONS favored the construction of a cement plant at Fairport, Ohio, for some time before the present plant was built by the Standard Portland Cement Company. These conditions practically all centered around the Diamond Alkali Company. This company uses a large quantity of limestone which must be of rather large size. In the handling of this stone a good portion of it was necessarily reduced to a size which was not suitable for their purpose but which would be excellent for the manufacture of cement. If this smaller stone could be used and the quantity purchased could be increased, a very reasonable price for the stone could be arranged. The Diamond Alkali Company had a coal pulverizing and a power plant which could be utilized by a cement plant on the adjoining property. Excellent railroad facilities already existed, and but a few additional sidings into the property would amply care for the needs of a cement company. Sufficient land was also available to build a plant that would have the advantage of all these factors.

Fairport itself afforded advantages for shipping and receiving material. Fairport being on Lake Erie, it was feasible to receive stone and gypsum by boat and also to ship cement by water. As the plant would be served by the Fairport, Painesville and Eastern Railroad, which connects at Painesville, two and a half miles away, with three main trunk lines, namely, the Baltimore and Ohio, the New York Central and the Nickel Plate railroads, excellent rail shipping facilities were available. All the highways in this territory are of good construction, so that excellent water, rail and highway distribution was available. Being advantageously situated with relation to many active cement consuming communities such as Cleveland, Akron, Erie, Youngstown, etc., Fairport afforded a market which could be served economically.

These factors are all accounted for

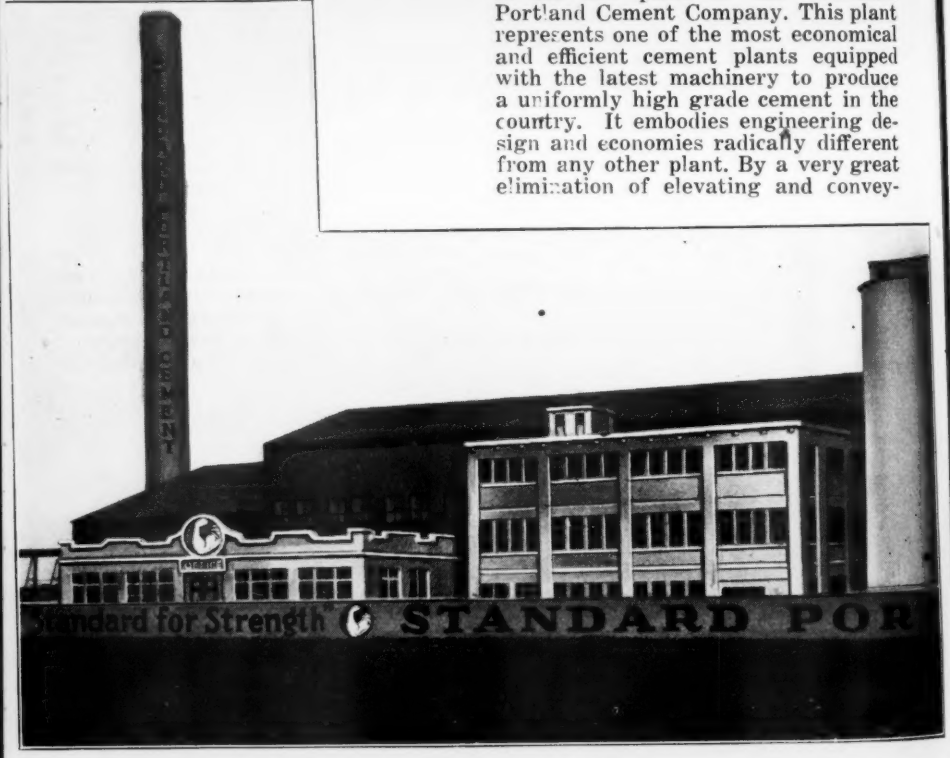


The New Plant of the Standard Portland Cement Company



The Raw Storage Building

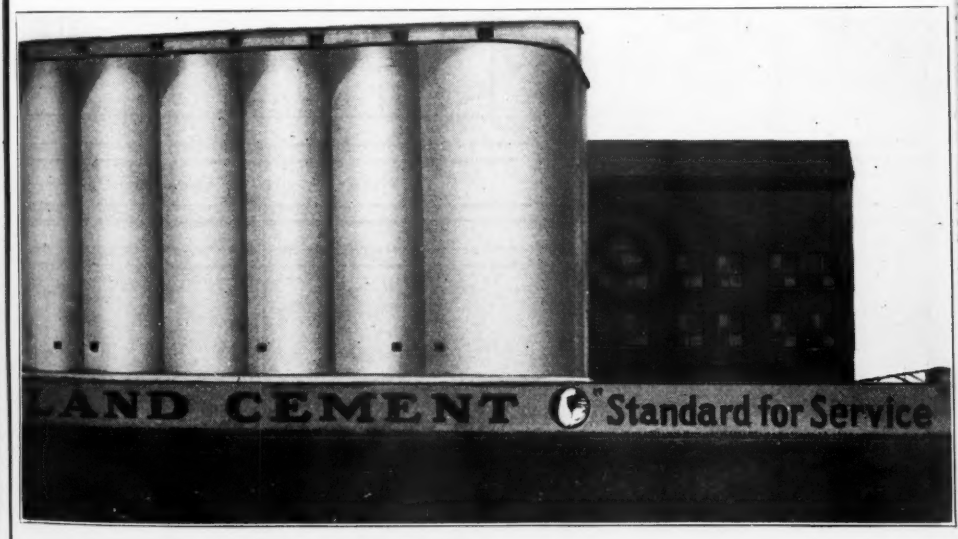
in the new plant of the Standard Portland Cement Company. This plant represents one of the most economical and efficient cement plants equipped with the latest machinery to produce a uniformly high grade cement in the country. It embodies engineering design and economies radically different from any other plant. By a very great elimination of elevating and convey-



A Photograph Retouched to Show the

The Three-Story Pack House and Storage Silos

ing machinery and the placing of all forms of stored raw material under one roof and handling them by a 10-ton overhead traveling crane, a large investment, probably $300,000, has been eliminated. Powdered coal from the Diamond Alkali plant is blown through an underground pipe line to bins at the kilns. This is another investment saving feature. It is only necessary to elevate the rock and gypsum from cars to storage. While all stone passes through a hammer mill, only about 15 per cent needs to be

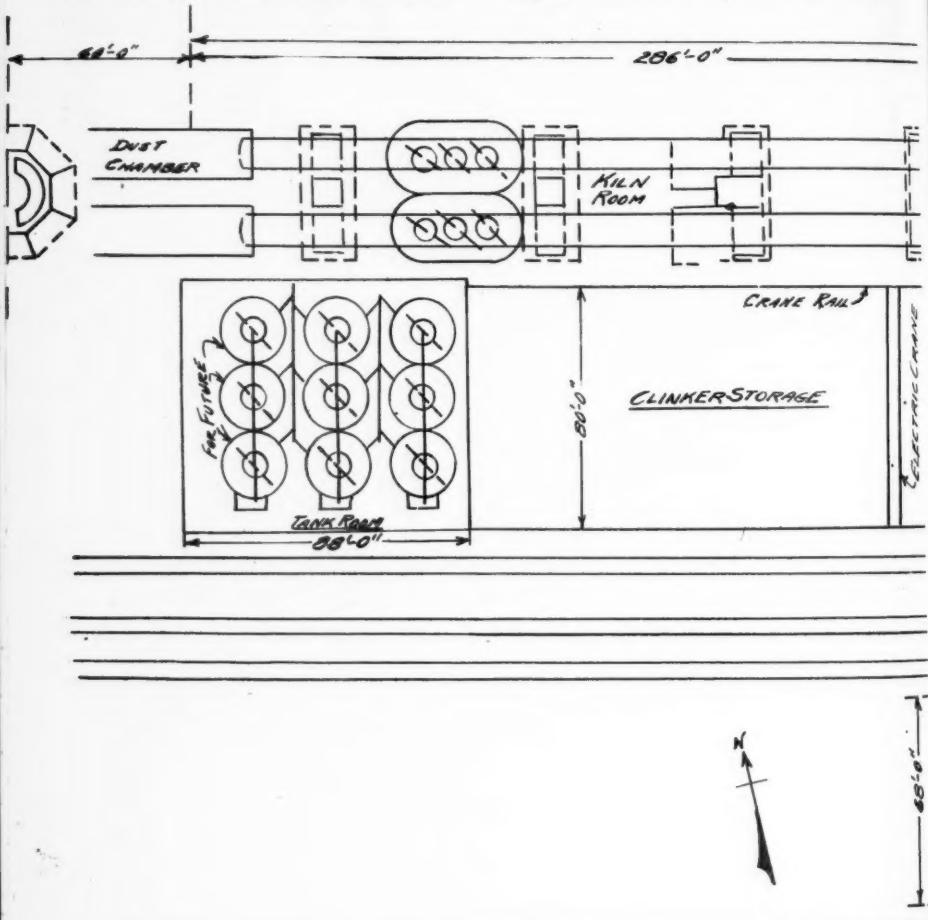


Plant As It Will Be When Finally Completed

ground.

Ground for this plant was broken on February 1st of this year, and clinker was made on August 3rd. At the present time the entire plant is in operation. This time establishes a record for cement mill construction. The engineering and general supervision of construction of the plant was the work of the Fuller Lehigh Company with Mr. M. B. Jones, chief engineer in charge. All the concrete construction, including a 150,000 - ton silo storage, a reinforced concrete bag and pack house, slurry tanks, and 8,000 cubic yards of miscellaneous construction, was handled by the Spencer Construction Company. The main building, which houses the wash mill, the grinding units, the kiln room and all raw storage, is 528 feet in length and 134 feet in width. It is built of structural steel with heavy corrugated steel sides and has concrete foundations.

Limestone is received from Rogers City, Michigan, in self - unloading boats at the docks of the Diamond Alkali Company. The stone is then screened in the screening plant of the Diamond Alkali Company. The stone too small for use in the alkali plant is loaded into cars and hauled to the cement plant. The stone is discharged from the cars to steel track hoppers from which it is fed by an apron feeder to a bucket elevator which discharges it to a Pennsylvania hammer

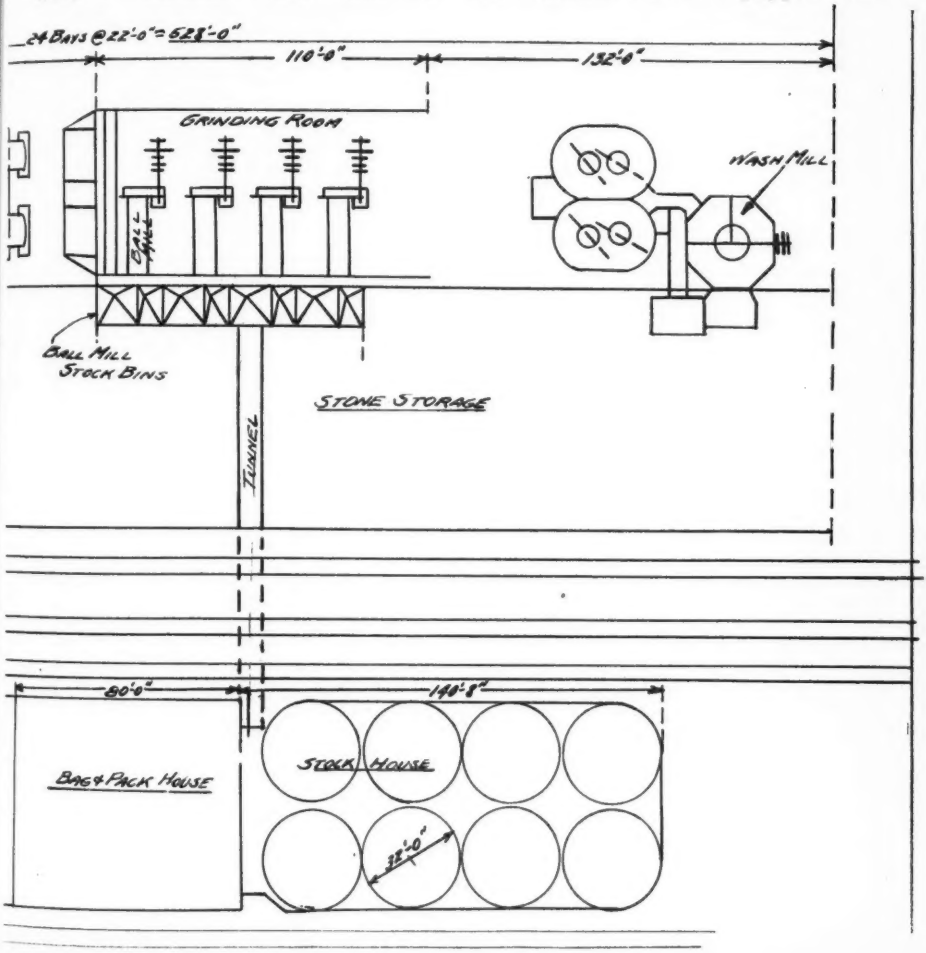


The General Arrangement of the

mill driven by a 100 h. p. General Electric motor. All the stone is sent through this crusher. The discharge is carried by another apron feeder to a bucket elevator which discharges it to pile storage in the raw storage building. Gypsum is also received in cars and discharged to a track hopper from which it is delivered by a belt conveyor to a chain bucket elevator, which discharges into a concrete bin of 250 tons capacity. The gypsum and stone handling at this point is the only instance of any material being elevated. The track hoppers, the apron feeders, and the bucket elevators were manufactured by the Variety Iron and Steel Works Company of Cleveland. These units are enclosed in casings manufactured by the same company.

Clay is secured from a deposit on the property about 500 feet from the plant. The clay is brought into the raw storage building by 20 yard Western dump cars and dumped on either side. Because of the location of the deposit it was not necessary to allow much storage space for clay.

All raw storage is under one roof. A 10-ton overhead Brown-hoist electric traveling crane moving the full length of the storage building, a distance of 440 feet, handles all the clay, stone and clinker. This means handling 1000 tons of stone and 200 tons of clay as a minimum daily, besides the clinker. The overhead crane is equipped with



Standard Portland Cement Plant

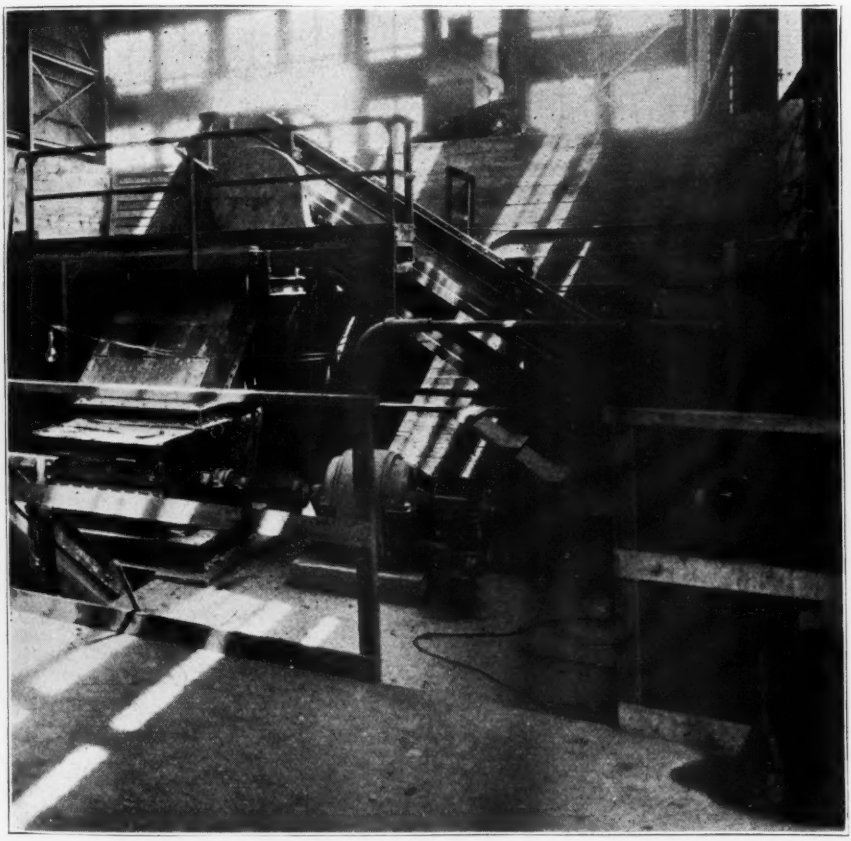
Top View Shows Mill Building and Pack House
Lower View Shows Car Discharging Clay

a 4½ yard bucket.

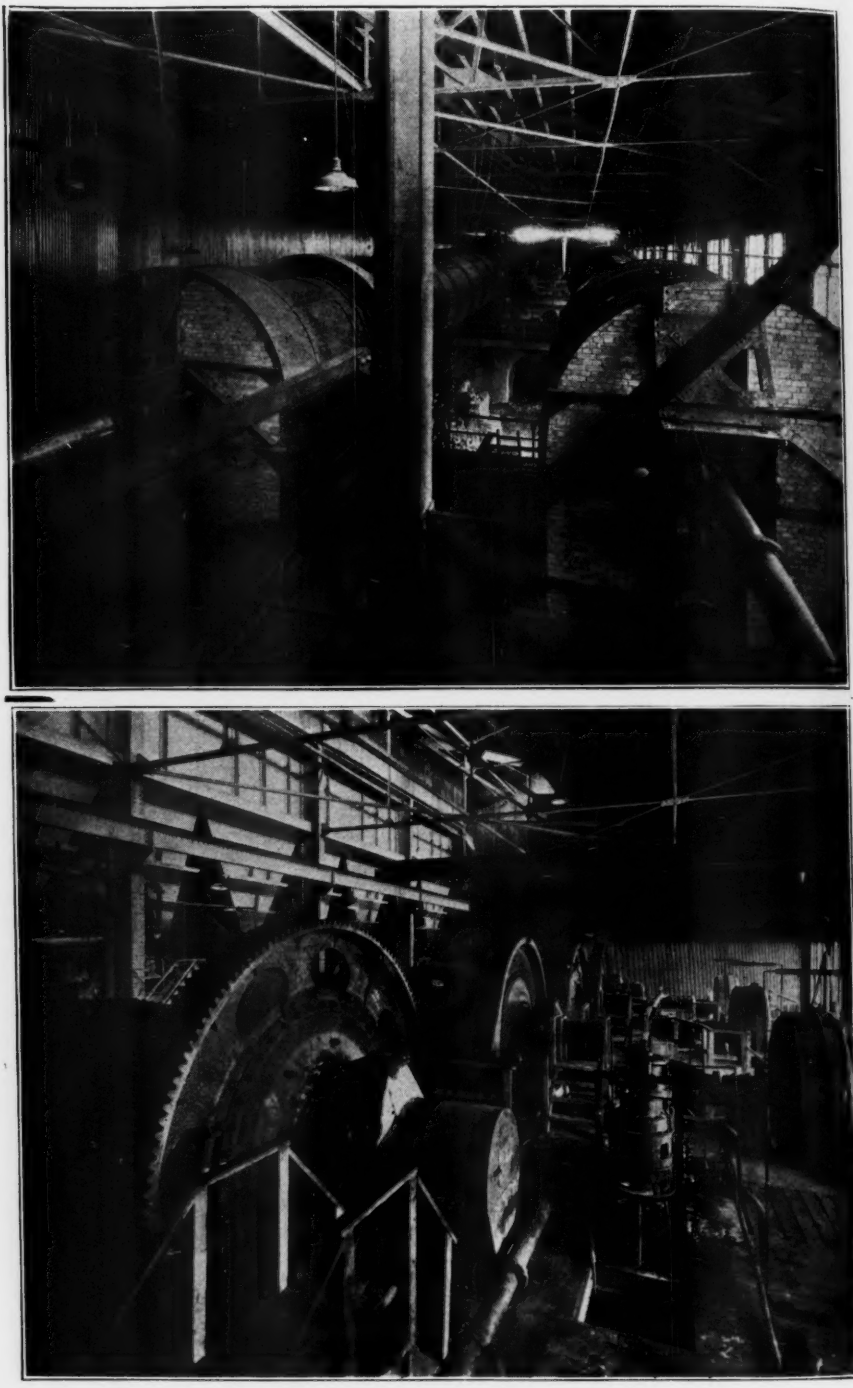
The overhead crane picks up the clay and deposits it in a concrete bin where a 4-inch stream of water breaks it up. This tank is 10x15 feet. The clay passes by gravity to an adjacent tank 15 feet wide and then through an inlet chute to a 29-foot octagonal F. L. Schmidt wash mill. The agitators are driven by a 40 h. p. Westinghouse motor at 870 r. p. m. with a leather belt drive. The clay passes from the wash mill into two concrete slurry basins elliptical in shape each with a long diameter of 30 feet and a short diameter of 20 feet. These tanks are 15 feet deep. Each slurry basin is equipped with double agitators driven by a 10 h. p. Westinghouse motor, and the speed is controlled by a Jones speed reducer giving a 22 to 1 ratio. Compressed air is used to facilitate agitation, and this air is supplied by Bury compressors. There are two of these compressors, each 14x8x10.

The slurry is pumped from the slurry basins to the Traylor wet compartment mills by two 4-inch Morris centrifugal pumps which are vertically driven by a 25 h. p. General Electric motor. The overflow is returned to the basins by a 6-inch pipe line. There are two Traylor compartment mills on the raw end and 2 on the finish end. Each is 7x26 feet and they are driven by 500 h. p. super synchronous General Electric motors.

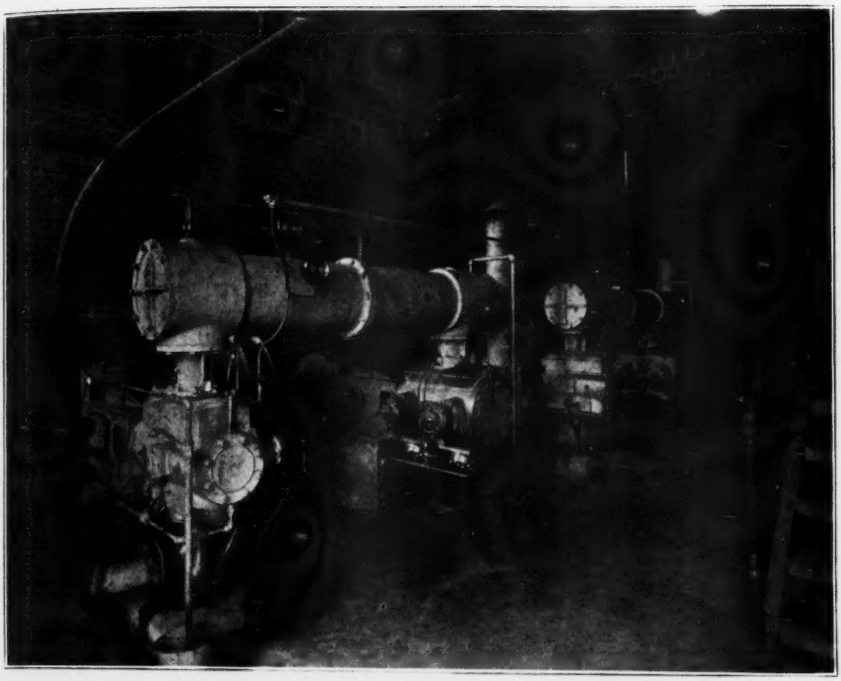
The raw rock is fed into the compartment mills by Schaffer poidometers from stock bins. The clay feed is controlled by a ferris wheel. There are four Schaffer poidometers, one



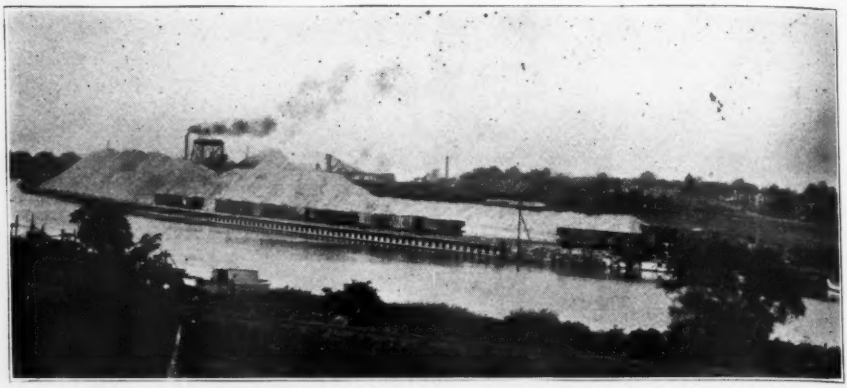
Conveyor from Track Hopper to Hammer Mill which is Also Shown



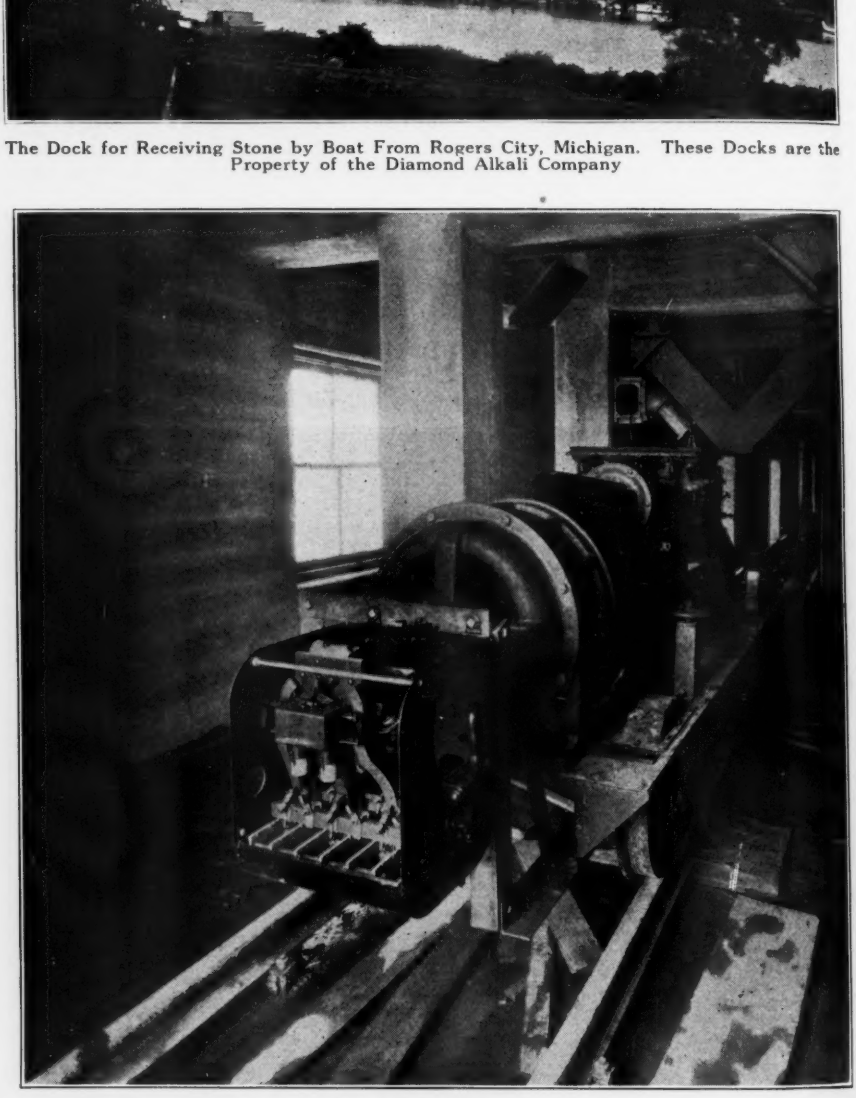
Upper View Shows Kilns and Lower View Shows Compartment Mills



Upper View Shows Air Compressors and Lower View Shows Slurry Correction Tanks



The Dock for Receiving Stone by Boat From Rogers City, Michigan. These Docks are the Property of the Diamond Alkali Company



Showing the Method of Handling Finished Cement

for each compartment mill. Morris pumps deliver the slurry to the correcting basins of which there are six, each of 10,670 cubic feet capacity. They are of steel construction and consist of two groups of three tanks. Provision has been made for an additional three tanks in case of need. Each group of tanks is equipped with agitators driven by a 25 h. p. General Electric motor and a James speed reducer with a ratio of 22.28 to 1. The slurry is analyzed every hour. The Bury compressors supply air to every tank. From the correction tanks the slurry flows by gravity to two elliptical concrete kiln basins each of 1100 barrels capacity. Here the slurry is again analyzed. The long diameter of these kiln basins is 40 feet and the short diameter is 20 feet. These basins are equipped with triple agitators each set of which is driven by a 10 h. p. General Electric motor with a Jones speed reducer of a 22 to 1 ratio. A 4-inch Morris centrifugal pump delivers the slurry to the ferris wheel feeders on the two kilns.

There are two Vulcan Iron Works kilns each 10x240 feet, driven by a 75 h. p. General Electric motor, and equipped with a Link Belt chain drive. A Jones speed reducer with a ratio of 20 to 1 enables the kiln operator to control the speed of rotation with the fuel feed. The fuel for burning the clinker is powdered coal which is secured from the Diamond Alkali plant through underground pipe line by air and delivered to steel hopper bins of 40 tons capacity. The powdered coal is fed to the kilns by the Fuller Kinyon automatic feeding system. An American blower driven by a 50 h. p. Westinghouse motor shoots the powdered coal into the kiln. This blower is of such capacity that both kilns may be kept in operation by the one unit. Sil-O-Cel insulation is used in the kilns with the exception of a few feet at each end. Each kiln is equipped with a dust chamber 18 feet in diameter. The reclaimed dust is conveyed by special conveyors which discharge to another conveyor which in turn discharges to a Fuller Kinyon pump which delivers to the kiln feeders. The conveyors

The Bates Packing Units

are driven by a 10 h. p. General Electric motor through a speed reducer manufactured by the Hill Clutch Machine and Foundry Company. The kiln dampers are regulated by Channon winches.

The kilns discharge the clinker to a drag conveyor which discharges into a concrete pit of 900 barrel capacity. The drag conveyor is driven by a 15 h. p. General Electric motor through a Jones speed reducer with a ratio of 51.75 to 1. There are two Traylor compartment mills 7x26 for the finish grinding. The clinker is fed to these bins by a 5-ton hand operated overhead crane.

The finished cement is conveyed through a tunnel running direct from the grinding room to the silo storage by a Fuller Kinyon conveying system. Four Fuller Kinyon pumps are used, and each is equipped with a 50 h. p. General Electric motor. There are eight storage silos with a total capacity of 150,000 barrels. Each silo is 32 feet in diameter and 60 feet in height. The pack house is 80x70 feet and has three floors. The cement is pumped by the Fuller Kinyon system to the baggers. There are four Bates packers. Cement is shipped in Bemis bags and the Bates paper bag. The filled bags are carried away by two 30-inch conveying units. These units were manufactured by the Variety Iron and Steel Works Company and have Dick conveyor belting and Timkin bearings. These conveyors are each driven by a 5 h. p. General Electric motor through Jones speed reducers. The packing is all done on the first floor. The cleaning, sorting and storage of bags is on the second floor. A rotary cleaner furnished by the Nazareth Foundry Company cleans the bags. This cleaner is driven by a 10 h. p. General Electric motor through Hill Clutch Machine and Foundry Company speed reducers and a Link Belt sprocket chain. Bags and any other material transported from floor to floor are handled by an Otis elevator. The third floor is available for bag storage. A Sly dust collecting system has been installed which completes the dust recovery equipment and renders the plant dustless.

Here we have a plant located ad-

The Drag Conveyor Unit Discharging to Storage

vantageously as regards gypsum and stone. Fuel is available under ideal conditions. Clay can be handled with less difficulty than in any other plant to our knowledge. In fact, it is a cement manufacture plant. All the raw materials and fuel are purchased, with the exception of clay, and the only concern is the actual manufacture of cement. A glance at the map will show the excellent cement consuming territory served. The plant represents one of the most economical investments in cement plants in the country. This enterprise probably has more favorable advantages than any other cement plant in operation. It is now producing a high grade cement at an unusually low cost and with a most economical investment in plant.

The officers of the Standard Portland Cement Company are T. R. Evans, President; W. A. Davis, Vice-President; C. N. Windecker, Vice-President; C. A. Follett, Secretary; and A. H. Ingley, Treasurer. E. J. Ochs is plant superintendent and Louis Creveling is chief chemist. At the present time the laboratories are in temporary structures, but a permanent office building and laboratory are now under construction. Mr. Davis will be actively engaged in directing the affairs of the company and he will personally supervise the sales maintaining his office in the Union Trust Building at Cleveland. Mr. Ingley will be the only other active officer.

Freight Car Loadings

Heavy movement of freight traffic continues to characterize the railroad situation. Loading of revenue freight for the week ended August 8 totaled 1,051,611 cars, according to reports filed by the carriers with the car service division of the American Railway Association.

This was an increase of 8,548 cars over the preceding week and the greatest number of cars loaded in any one week so far this year. It also was the fourth consecutive week this year that loadings have exceeded the million car mark.

Increases over the week before were reported in the loading of all commodities with the exception of miscellaneous freight and ore which showed small decreases. The total for the week of Auugst 8, was an increase of 110,204 cars over the same week last year and an increase of 77,861 cars over the same week in 1923.

Coal loadings tctaled 189,761 cars, an increase of 8,825 cars over the preceding week and 39,975 cars above the same week last year and an increase of 12,494 cars over the same week two years ago.

Grain and grain products loadings amounted to 53,411 cars, an increase of 2,468 cars over the week before, but 4,037 cars below the same week last year. It was, however, 7,233 cars above the same week in 1923. In the western districts alone, grain and grain products loadings totaled 33,466 cars.

Loading of merchandise and less than carload lot freight amounted to 258,443 cars, an increase of 3,284 cars over the week before and 18,724 cars agove the same week last year. Compared with the corresponding week two years ago, it also was an increase of 30,559 cars. Compared with the preceding week this year, increases in the total loadings of all commodities were reported in all districts except the eastern, northwestern and southwestern districts.

A comparison by weeks follows:

	1925	1924	1923
August 8..	1,051,611	941,407	973,750
August 1..	1,043,063	945,613	1,033,465
July 25...	1,029,603	926,309	1,041,415
July 18...	1,010,970	990,230	1,001,350
July 11...	982,809	909,973	1,019,800
July 4....	864,452	757,904	850,082
June 27...	991,341	908,251	1,021,471
June 20 ..	982,600	803,546	1,005,432
June 13...	987,106	902,592	1,008,838
June 6....	994,874	910,793	1,012,312
May 30...	920,514	986,209	820,551
May 23...	986,209	918,214	1,015,532
May 16 ...	984,916	913,201	992,319
May 9....	981,370	908,213	974,078
May 2....	981,711	913,550	961,017
April 25..	959,225	878,387	962,578
April 18..	922,778	876,916	970,042
April 11..	917,284	880,937	945,271
April 4...	922,375	861,990	896,375
March 28.	931,395	907,389	896,735
March 21.	909,363	908,290	916,818
March 14.	924,149	916,762	904,116
March 7..	930,009	929,381	905,344
Feb. 28...	862,910	944,514	916,624
Feb. 21...	925,295	945,679	830,187
Feb. 14...	902,877	935,589	816,646
Feb. 7....	928,244	906,017	849,352
Jan. 31....	896,055	929.623	865,314
Jan. 24....	924,254	894,481	896,464
Jan. 17....	932,150	894,851	864,297
Jan. 10...	932,807	872,023	873,908
Jan. 3....	765,727	706,292	727,246

Portland Cement Output in July, 1925

Production and shipments of Portland cement reached new high levels during the month of July, according to statistics compiled by the Bureau of Mines, Department of Commerce. Production shows an increase of more than 11 per cent, and shipments more than 9 per cent, over July, 1924. Stocks of Portland cement decreased considerably, but are nearly 13 per cent higher than in July, 1924. The output of three new plants, located respectively in Georgia, Michigan and Ohio. is included for the first time in the statistics. The following tables, prepared by the Division of Mineral Resources and Statistics of the Bureau of Mines, are based mainly on the reports of producers of Portland cement. The July, 1925, totals include estimates for one plant.

Production, shipments, and stocks of finished Portland cement, by districts in July, 1924 and 1925, and stocks in June, 1925, in barrels.

Commercial Districts	Production July		Shipments July		Stocks at end of July		Stocks at end of June
	1924	1925	1924	1925	1924	1925	1925*
Eastern Pa., N. J. and Md.	3,418,000	3,703,000	4,205,000	4,564,000	2,734,000	2,460,000	3,321,000
New York	718,000	838,000	962,000	1,045,000	784,000	778,000	985,000
Ohio, Western Pa. and and W. Va.	1,503,000	1,618,000	1,955,000	1,754,000	1,193,000	1,599,000	1,735,000
Mich.	1,058,000	1,223,000	1,100,000	1,322,000	528,000	967,000	1,065,000
Wis.,† Ill., Ind. and Ky.	2,166,000	2,249,000	2,570,000	2,743,000	1,950,000	2,611,000	3,106,000
Va., Tenn., Ala. and Ga.	962,000	1,230,000	1,109,000	1,375,000	606,000	264,000	410,000
Eastern Mo., Ia., Minn. and S. Dak.‡	1,333,000	1,444,000	1,633,000	1,846,000	2,110,000	2,406,000	2,808,000
Western Mo., Neb., Kans. and Okla.	935,000	1,110,000	993,000	1,187,000	1,137,000	1,539,000	1,615,000
Texas	409,000	454,000	442,000	463,000	264,000	232,000	241,000
Colo. and Utah	273,000	246,000	293,000	208,000	167,000	381,000	343,000
California	986,000	1,122,000	1,025,000	1,139,000	326,000	435,000	451,000
Ore., Wash. and Mont.	268,000	404,000	327,000	485,000	520,000	248,000	329,000
	14,029,000	15,641,000	16,614,000	18,131,000	12,319,000	13,920,000	16,409,000

*Revised. †Began producing June, 1924. ‡Began producing December, 1924, and shipping January, 1925.

Stocks of clinker, or unground cement, at the mills at the end of July, 1925, amounted to about 6,967,000 barrels compared with 7,937,000 barrels (revised) at the beginning of the month.

Production, shipments, and stocks of finished Portlant cement, by months, in 1924 and 1925, in barrels.

Month	Production		Shipments		Stocks at end of month	
	1924	1925	1924	1925	1924	1925
January	8,788,000	8,856,000	5,210,000	5,162,000	14,155,000	17,656,000
February	8,588,000	8,255,000	5,933,000	6,015,000	16,815,000	19,689,000
March	10,370,000	11,034,000	8,995,000	10,279,000	18,189,000	20,469,000
1st quarter	27,746,000	28,145,000	20,138,000	21,456,000		
April	11,726,000	13,807,000	12,771,000	14,394,000	17,159,000	19,877,000
May	13,777,000	15,503,000	14,551,000	16,735,000	16,403,000	18,440,000
June	13,538,000	15,387,000	15,036,000	17,501,000	14,903,000	16,409,000a
2nd quarter	39,041,000	44,697,000	42,358,000	48,630,000		
July	14,029,000	15,641,000	16,616,000	18,131,000	12,319,000	13,920,000
August	15,128,000		16,855,000		10,666,000	
September	14,519,000		16,827,000		8,404,000	
3rd quarter	43,676,000		50,296,000			
October	14,820,000		17,160,000		6,073,000	
November	13,141,000		10,289,000		8,928,000	
December	10,435,000		5,506,000		13,913,000	
4th quarter	38,396,000		32,955,000			
	148,859,000		145,747,000			

a Revised.

A Survey Concerning Night Operation

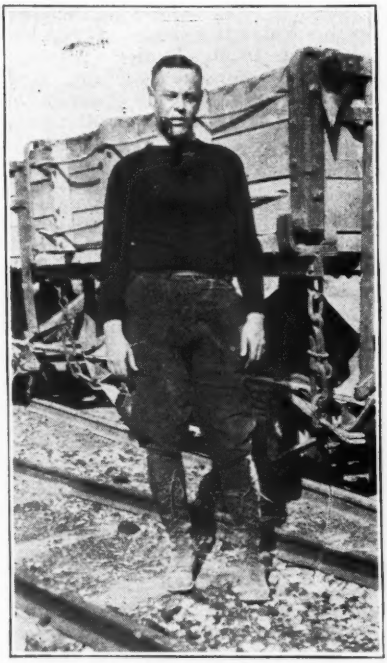
Written Expressly For Pit and Quarry By R. N. Van Winkle

"NIGHT QUARRY OPERATIONS" was the title of an article by the writer published in the April 1, 1925, number of Pit and Quarry. The article was based entirely on the writer's personal experience in night quarry and open pit mining operations and was not, as some readers and operators thought, a new departure in quarry and open pit mining practices, which the writer was championing and attempting to introduce to the industry as a whole. Night work was, in our own particular operation, a means of satisfying our customers during the peak season demand for our product and of increasing our volume of business with comparatively no increase in overhead or fixed charges.

Considerable comment both for and against night quarry operation was the result of the article, and from many operators came the request for more authentic information on the subject. Therefore, the writer determined to make an investigation and to obtain, if possible, first hand information as to the experience of others on this much debated subject of whether or not night quarry and open pit mining operations are practical and profitable. After going into the question at length the writer can do no better in this article than to quote extracts from correspondence upon this subject, as information is available from some 161 quarry and gravel plant operations scattered from the extreme north to south and from east to the far west.

As an opening gun in defense of night operations it may be stated that the Michigan Lime Stone and Chemical Company at Rogers, Michigan, one of the largest, if not the largest single quarry operation in the country, operates two 10 hour shifts every 24 hours, and moreover very successfully. Mr. W. F. Wise, President of the Stringtown Crusher Rock Company, whose quarry operations are at Stringtown, Oklahoma, is a believer in night operations as will be evidenced from quotations from his letter on the subject as follows:

"When sales justify we operate very successfully two 10 hour shifts. Our plant is electrically operated, so all we have to do for night running is to turn on the light. Our experience is that any night running can only be made efficient by making the entire plant and that part of the quarry being used, practically as light as day. To do this we are not stingy with large lights where needed. There is no difficulty in accomplishing this if sufficient lights are installed, and just a little common sense used in the placing. . . . Our night production runs about the same tonnage as the day."



R. N. Van Winkle, Who Personally Supervised His Own Night Operations

The Biesanz Stone Company, producers of washed and screened sand and gravel at Winona, Minnesota, came forward with a very strong and concise recommendation when President C. P. Biesanz wrote:

"We have had considerable experience here at Winona working 24 hours a day, and we find that night work is satisfactory, after you have rightly organized for it. As to the kind of lighting, we used carbic lights on the shovels and electric flood lights around the plant. The cost of operating at night is practically 10 per cent above day work."

A quarry operator who has had long experience in night operations is Mr. D. W. Evans of the Daniel Evans Stone Company at Marion, Ohio. After reading the following extracts from his letter the reader should have no doubt as to Mr. Evans' attitude:

"We have, for the past five years, run practically on the twenty-four hours basis from six to eight months of each year. . . . We find this to be very satisfactory, and the output ranges from 80 to 90 per cent as much as the day output. We have lighted our plant, tracks and shovels with electricity and wish to say that, during the summer months it is much more pleasant to work at night than day. We have quite a task to keep the men from working at night."

The writer wishes to call particular attention to the last sentence in the above letter in reference to men preferring to work on the night shift in summer, as this was our own experience.

Unquestionably the most interesting and constructive reply in this survey was received from Mr. A. O. Ayers, General Manager of the Eau Claire Sand & Gravel Company, Eau Claire, Wisconsin. Mr. Ayers gives the advantages and disadvantages of night operations in a letter which is so strictly to the point that we quote it in its entirety.

"We have found night operation to be profitable for these reasons:

1. Increases income without increasing overhead; therefore, decreases unit cost of product.

2. Makes it possible to take advantage of peak demand at certain seasons of the year, and is still more profitable if stock-piling facilities are available.

3. Makes it possible for both the large and small producer to give better service during periods of high demand by having material ready to load out.

4. Frequently due to plant arrangement truck delivery business interferes more or less with the loading of railroad equipment, and by the proper organization of production and loading, this can be partially remedied by night operation.

5. During the hot weather night crews will invariably get out more material than the day crews, due to cool nights, etc.

6. Machinery will operate to better advantage at night due to lesser heating effects.

"Some of the disadvantages of night operation are:

1. On account of difficulty of thoroughly illuminating plant and operations, breakdowns are more apt to happen; accidents to employees take place oftener; all of which increase expense.

2. The necessity of two different crews, both with the same responsibility of care of equipment, etc., frequently causes friction; but this same situation can be easily used to advantage by bringing about competition in quantities produced by two shifts.

"If 20 hours per day operation is carried on over several months, great care must be used to give thorough inspection to machinery at more frequent intervals, and more spare parts must be kept on hand than during 10 hours a day operations. Double units throughout the plant are a decided advantage in 20 hour a day operation."

While the survey of the situation showed that more operators had met with success than with failure in attempting night operations, it is the writer's wish in this article to quote from letters both for and against it. A good example of a company opposed to night operation is the Thomas Lime and Stone Company of Thomasville, Pennsylvania, from whose letter we quote:

"We have figured that the machinery needs a rest practically the same as the employees, also that the same should have some time off in order to make the necessary repairs. This, of course, could be overcome by duplicating the machinery on your entire plant. The production we have found falls much below the day production. The reason for this is hard to explain unless unfaithful employees, some of which every plant employs, take advantage during this time."

Mr. Hugh Haddon, Jr., of the Menantico Sand & Gravel Company, of Millville, New Jersey, does not mince words in condemning night operation. As it appears from his letter, the disadvantages are great. He says:

"At various times we have operated our plant continuously for 24 hours, and our experience has been that during the summer months we get about 50 per cent efficiency from the night shift. This applies to a plant operated by about 30 men, the method of operation being by pumping and loading cars direct from screening plant. On our pump boats we use electric

lights, generating our own current.

"I know of no advantage in night operation, but have always found that night operations tend to slow up the day operations, because the night shift is prone to have undone little things that keep the plant at top notch production. Loading from stock pile by locomotive crane or other device should be as efficient by night as by day; but any operation that has much hauling by train will be even more seriously affected.

"Our experience has been that in using the night shift our cost of production for the material produced over what would be produced by the day shift is increased just about 100 per cent. That is, if we averaged 2,000 tons per day on one shift, the two shifts would only give us an average of about 3,000 tons at practically double the cost.

Mr. Rogers, President of the Union Rock Company of Los Angeles, California, is not a believer in night operating; still he says there are exceptions to all rules. He says:

"We find that there are so many little minor repairs to make each day that it is not economy to try to operate on a 24 hour basis. Of course, there are exceptions to all rules, and we have operated some of our plants a second shift this past season trying to give service to our customers, but the financial results secured on a 24 hour basis are not nearly as good as when the plant is running only 10 hours, and the regular repair gang is allowed to work the night shift on repairs."

Before making a decision in your own mind as to the merits or disadvantages of night operating, provided a verdict has not already been reached, it might be helpful, at least interesting, to know just what the results of the canvass on night operating showed. Of 161 inquiries sent out and replies received, the following was the result:

In only one or two instances were operations carried on continuously for 24 hours, while two 10 hour shifts were the most popular. In many operations two 8 hour shifts were used, and several operations were handled successfully with one shift working 12 to 15 hours. The France Stone Company who have been very successful operators, are believers in long shifts and have this to say in part on the subject:

"It has never been successful in our minds caused by several different reasons. We feel that we can produce as much stone at a considerably lower cost during a twelve or fourteen hour operation on the basis of one shift than can be done with two shifts of approximately ten hours each."

Tonnage produced and operating costs for night operation as compared with day show a wide range. In several instances companies report that the night shift produced equally as much as the day crew, while others report tonnage production at night from 50 to 90 per cent of the day time operation. Operating costs in most cases are higher, running from 8 to 20 cents more at night. Some companies, however, report no apparent increase in operating costs at night over day time operation.

The consensus of opinion of operators, who have been successful with night operation, is that proper illumination is absolutely essential; and while carbide lights are used, electricity, either from a power line or generated from a unit plant such as a Delco plant or turbine generator, is the most satisfactory. Electric flood lights are particularly efficient, but if electricity is depended upon entirely, one company has made a good suggestion of making a practice of keeping oil lanterns lighted and easily accessible to the men in case of lighting failure.

	Quarries	Sand and Gravel
Companies where night operation has been successful.....	16	14
Companies where night operation has not been successful...	8	14
Companies having no experience in night operation, but think it practical.....	5	7
Companies having no experience in night operation, but think it impractical	4	9
Companies having no experience and making no comment as to its practicability	41	43
Total	74	87

In the previous article on this subject the writer made reference to less interference and more constant supply of electric current at night. The Cleveland Stone Company has this to say regarding this phase of the subject:

"In using electricity from a large central station we have found the service much better at night than during the day because the other power customers' requirements are less. It also lowers the gross unit cost of energy when power is purchased on the maximum demand and kilowatt hour basis."

Reference was also made by the New Inland Gravel Company of Hattiesburg, Mississippi, regarding electric current at night. Their experience was as follows:

"The greatest advantage which we derived by night operation was the perfect power service. During the day our local traction company was barely able to supply the different industries which are electrically operated, and we often had from one to two hours' delay on account of our pipe line becoming choked when the power would be cut off when the pipe line was carrying a heavy load. We were able to load from one to three cars more at night than during the day, with no delay during the day."

Where night operations have been carried on successfully, ample time is generally allowed between shifts for repairing and inspecting machinery, and as a rule no attempt is made at night to do any preliminary work, and attention is confined to actual production. The Utah Sand and Gravel Company of Salt Lake, Utah, covers this quite thoroughly in a paragraph in their letter as follows:

"Day and night operation in our organization results that our daylight crew was larger than the night crew. At night we had only one shift of actual plant operators. No effort was made to attend to any other duties except production. The daylight operations, of course, were carried on as usual except that additional men were employed to keep the plant up: track changes, shipping, oiling, fueling, repairing, etc."

Another reply which throws considerable light on how the work is divided is that of the Crystal River Rock Company of Crystal River, Florida.

"We are running two shifts here in our quarries, of 10 hours each. This gives us an hour between each shift as well as an hour for noon in each shift, which time is used for repairs, blasting, etc.

"We require the day shift to build all tracks in the pits, do all primary blasting, and as much of the secondary drilling and blasting as possible . . . . In other words everything that can be prepared or done for the night shift is done in daylight. . . . For the above reason it is impossible to arrive at a correct comparison of the costs of the night and day shifts."

In discussing night operations the question of procuring competent additional labor and mechanics for two shifts presented itself quite often. The writer's experience in this matter was that when we decided to use two shifts, we split our organization, assigning our more reliable and experienced men to the night work, and then around a skeleton day organization which was left we built a comparatively new force of men. The writer has found that this is the general practice except where night operations are carried on continuously, in which case it is necessary to have two experienced shifts of men. Under such conditions the shifts or crews work alternately days and nights for periods of one or two weeks or even a month. There is another side to this, as the Island Sand and Gravel Company of Columbus, Ohio, writes:

"A night shift as a very general rule, is but a temporary makeshift, does not take the same interest in its work, does not know when it is going to be laid off. The good men from the day crew, from which the night shift is organized, go on with reluctance, feel aggrieved that they have been selected, or as they feel, 'discriminated against,' etc."

While no particular details were given in responses received regarding the hazard of night operation, the impression is prevalent that night operations are more hazardous. Darkness is a handicap, but if it is so arranged that the night crew will start work before darkness, so that they can get their bearings, so to speak, and have an opportunity to see everything in its place before darkness comes on, it is a great help. The Consumers Company of Chicago makes this reference to accidents:

"Our experience has been that acci-

dent both to men and equipment are much more frequent at night than in the day time, and unless it is impossible to get away from night operation, we are always very much disposed to do so."

While our own experience in night operation was successful, we know that each quarry or open pit mining operation has its own particular problems; and it would be impossible to lay down a general rule as to whether or not it would be practical to operate at night. Long days in the summer offer great opportunity for lengthening hours of operation when production is essential.

The human element plays a large part in the success of night work in the absence of the usual superintendence which is as a rule provided during daylight operation; but with suitable foremen and superintendents just as good work should be done. This is especially true where operations are mechanical, such as steam shovel, locomotives, sand and gravel pumps, hoists, etc., for then the men have stationary posts and do not have to move about in performing their duties. Moving about increases the hazard in night work.

To summarize this proposition of night operation, this can be said. Night operations are never carried on as a matter of choice, as the daytime is the logical time to operate quarries and open pit mining; but they are a means to an end. That end is to provide service to customers by meeting their requirements at a time when they need your product, thereby making a booster for your company and a satisfied customer. As one operator found, it was a means of saving him money as well as his reputation; for with a freight rate increase staring him in the face he found himself with a large delivered price contract and the time growing short. He lighted up his barges and washing tower, operated nights and completed the particular contract successfully.

We believe that the latent possibilities of some of our quarries are tremendous from a standpoint of operating. These properties must be studied, not just worked; and if this were done, one would be surprised at the possibility of overcoming obstacles encountered in daily operation.

The pros and cons of night operation have been presented. It is a subject which has been given much consideration by producers and operators. This has been shown by the response to inquiries sent out. The question as to whether it is practical to operate at night must be solved by the management in each individual case. Before doing so it might be well to consider the following phases of the question:

Whether the demand for product is constant or merely seasonable.

Whether proper lighting arrangements can be worked out and cost of same.

Whether labor supply is adequate, and supervision available.

Whether no overhead charges at night and tonnage produced have good effect on operating costs.

Whether operations can be properly illuminated so machinery can be watched to prevent excessive breakdowns.

Whether it is more economical and satisfactory to increase plant capacity, or operate additional hours.

Whether adequate storage capacity is available for night production or whether switching service and empty cars can be procured from railroads.

Whether night operations are more hazardous on workers than day operations.

Whether there is a tendency on the part of men to neglect repairs and put blame on the other shift, and if same can be remedied.

Whether it is a question of rendering service to customers or increasing profits that is the most important.

Whether it is necessary to inaugurate and carry forward night operations continuously to be successful.

Heil Company Makes Changes

The Heil Company, manufacturers of tanks, bodies, hoists, etc., Milwaukee, Wisconsin, has issued an announcement of the new address of the Heil Northwestern Sales Company at St. Paul, Minnesota. The location is 2651 University Avenue, on the midway between St. Paul and Minneapolis. E. E. Moore and Clarence R. Sundbloom have charge. It is also of interest to note that the name of the Spinks Supply Company, Memphis, Tennessee, Heil distributors, has been changed to Universal Equipment Company, Inc., with a new location on Riverside Boulevard.

Distribution of Cement

The following figures show shipments from Portland cement mills distributed among the States to which cement was shipped during May and June, 1924 and 1925.

Portland cement shipped from mills into States, in May and June, 1924 and 1925, in barrels. *a*

Shipped to	Year 1924	January 1925	February 1925	March 1925	April 1925	May 1924	May 1925	June 1924	June 1925
Alabama	1,871,885	85,410	103,513	177,510	191,541	129,432	185,314	115,416	214,195
Alaska	6,304	132	0	294	709	637	0	132	1,284
Arizona	389,935	34,370	25,945	27,009	31,264	33,469	32,749	31,126	32,451
Arkansas	1,099,304	41,376	44,352	72,198	94,695	75,258	87,340	89,507	92,101
California	10,772,733	988,883	753,123	1,029,118	1,027,744	1,044,824	1,081,945	954,751	1,066,088
Colorado	1,334,493	42,425	69,871	102,537	131,363	141,894	125,744	140,995	120,818
Connecticut	1,576,021	34,810	50,026	113,668	160,616	166,717	177,292	181,858	172,564
Delaware	384,228	9,444	21,766	41,573	42,874	28,892	34,413	37,330	
District of Columbia	718,146	37,285	65,176	58,474	70,765	51,807	103,996	60,307	81,334
Florida	2,155,836	265,463	227,811	272,094	261,180	170,110	313,846	148,144	348,330
Georgia	1,406,476	93,062	98,569	140,634	112,250	117,426	127,545	113,412	129,748
Hawaii	40,587	417	0	1,500	2,250	1,979	5,608	944	6,108
Idaho	262,142	2,598	11,029	17,667	28,393	28,199	28,613	20,583	28,122
Illinois	13,309,655	463,388	378,947	846,638	1,467,815	1,421,534	1,790,601	1,311,151	1,636,329
Indiana	5,492,150	139,782	143,464	255,597	433,996	523,774	569,436	556,814	617,360
Iowa	3,138,347	53,044	52,039	161,164	284,477	421,523	346,484	393,866	310,558
Kansas	2,128,898	33,588	120,405	212,402	232,220	247,164	242,880	194,394	233,522
Kentucky	1,727,038	52,013	68,970	115,222	174,795	145,624	195,351	157,555	231,491
Louisiana	1,255,952	75,992	97,638	98,193	108,250	106,977	99,402	100,299	100,016
Maine	386,092	4,837	5,238	21,702	36,163	45,512	38,435	49,013	43,541
Maryland	1,983,993	47,635	98,231	143,291	207,844	157,933	231,935	192,865	249,105
Massachusetts	3,352,294	113,101	134,591	257,381	344,406	364,354	374,243	372,620	350,620
Michigan	9,335,798	190,905	248,240	437,712	859,815	989,217	1,140,027	1,133,346	1,264,462
Minnesota	5,238,161	59,395	97,034	173,618	321,854	404,999	425,473	451,614	409,235
Mississippi	507,201	29,867	28,564	35,778	48,174	48,772	47,573	38,886	66,012
Missouri	3,929,248	115,141	162,992	379,157	489,316	391,946	652,330	290,852	583,561
Montana	202,541	5,334	6,093	16,450	23,030	28,421	28,170	22,106	28,904
Nebraska	1,496,892	31,832	46,281	99,780	180,951	154,977	198,338	132,394	181,516
Nevada	90,949	2,492	5,177	7,254	10,767	8,480	11,676	11,463	10,784
New Hampshire	377,917	9,419	15,911	27,592	39,906	37,609	36,814	39,026	40,837
New Jersey	6,345,124	157,612	243,534	498,227	722,751	593,922	721,605	682,058	737,572
New Mexico	236,644	7,911	10,320	18,865	19,699	37,588	17,141	27,893	18,406
New York	17,282,302	400,896	587,674	1,159,830	1,717,441	1,710,784	2,028,808	1,986,895	2,090,644
North Carolina	2,846,808	79,817	128,770	200,097	277,616	319,454	289,056	278,936	324,201
North Dakota	270,354	1,380	3,742	16,589	38,937	29,414	47,780	45,337	66,089
Ohio	9,201,578	259,628	271,075	592,069	894,683	863,045	1,054,230	958,245	1,099,767
Oklahoma	2,201,699	58,872	155,083	203,161	201,886	264,611	235,096	189,119	225,879
Oregon	1,205,672	54,117	60,816	103,813	101,661	113,812	129,048	122,893	134,038
Pennsylvania	12,950,829	288,916	421,519	808,636	1,250,501	1,093,389	1,482,560	1,298,303	1,869,299
Porto Rico	6,686	0	0	0	0	0	0	5,186	0
Rhode Island	612,344	15,668	17,908	54,083	79,063	73,437	72,914	73,286	89,213
South Carolina	571,372	46,840	73,313	72,929	65,806	51,285	74,198	47,118	85,087
South Dakota	472,154	4,331	14,528	40,697	57,039	49,995	66,445	54,540	59,120
Tennessee	1,590,992	69,669	87,499	116,856	133,037	155,684	163,812	129,124	185,536
Texas	3,844,187	260,540	345,057	381,320	401,517	359,570	373,605	344,403	411,795
Utah	429,630	3,794	16,821	28,567	33,469	62,439	41,447	53,956	37,733
Vermont	337,146	3,129	3,060	10,312	25,353	28,991	24,178	72,169	26,978
Virginia	1,685,953	54,445	95,942	132,891	160,139	156,109	154,167	118,672	172,760
Washington	1,831,348	85,969	90,669	151,814	180,845	192,570	265,735	275,028	328,589
West Virginia	1,663,250	45,912	56,629	85,703	134,357	149,396	140,992	215,505	161,484
Wisconsin	4,357,044	113,396	73,320	142,620	358,379	474,104	507,654	524,846	569,687
Wyoming	328,221	3,492	9,181	16,358	19,981	40,153	32,466	46,734	31,290
Unspecified	684,598	15,964	26,430	46,236	34,875	139,036	8,023	67,442	3,996
	144,324,321	5,494,594	5,961,265	10,205,015	14,327,467	14,462,240	16,622,910	14,924,240	17,417,489
Foreign countries	870,840	69,910	53,437	73,927	88,770	84,933	73,984	84,460	84,411
Total shipped from cement plants	145,747,000	5,564,000	6,015,000	10,279,000	14,416,000	14,547,000	16,696,000	15,008,000	17,501,000

a Includes estimated distribution of shipments from three plants for May and June, 1924; and from four plants for May and June, 1925.

Meeting The Demand For Better Lime With a Thoroughly Efficent Plant

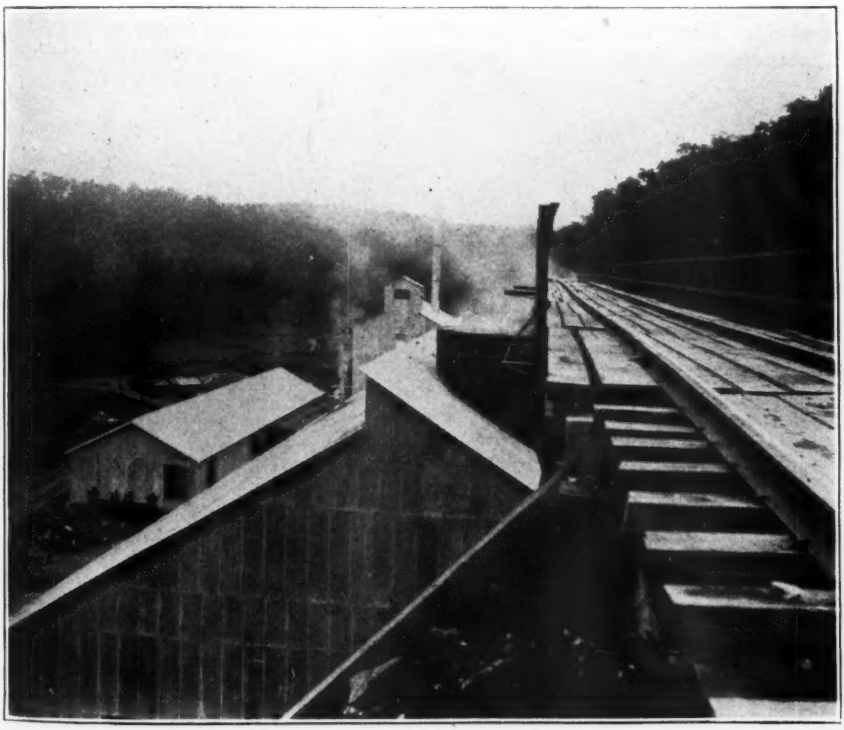
Batesville White Lime Company Now Operates Efficient Plant Extensive Research Reveals Deposit of Unusual Quality

ENGINEERING skill is very much in evidence in the new lime plant of the Batesville White Lime Company at Limedale, Arkansas. The company started producing lime during July of this year. This company has another plant at Ruddells, Arkansas, which will be continued in operation. The combined capacity of the two plants is 1000 barrels a day. The Ruddells plant does not compare in any way with the new Limedale plant, which is the finest lime plant in the Southwest. The new plant was built largely because conditions in the territory served by the Batesville White Lime Company were such that a better product was being demanded, and the most efficient type of plant was necessary.

Three years ago this company started search for a deposit of limestone that would give a pure white product of superior quality. Practically every large deposit of limestone in the northern part of Arkansas was prospected before the deposit in Independence County, several miles from Batesville, Arkansas, was selected. Then a year was spent in core drilling, burning, analyzing and testing the deposit for quality and quantity. The average analysis of these tests was as follows:

Silica	0.32
All other insolubles	0.06
Calcium carbonate	99.34
Magnesium carbonate	0.01
Ferric oxide	0.05
Alumina	0.19

Construction on the plant was started in the spring of 1924, and



An End View of Plant Showing Kilns

The New Batesville White Lime Company Plant at Limedale, Arkansas

operations were under full swing in July of this year. The new plant is located at Limedale near Batesville on the Missouri Pacific Railroad. This is one of the largest railroad systems west of the Mississippi River, having approximately 15,000 miles of track serving a territory of thirteen states extending from South Dakota to the Gulf of Mexico, and from the principal Mississippi River crossings to the far West. Batesville is a town of few industries, and a good surplus of cars is generally available. The plant is within the yard limits of Batesville which is insurance against car shortage.

The limestone property consists of 400 acres of Boone limestone free from silica and other substances detrimental to a perfect lime. The stone runs to an average depth of 135 feet.

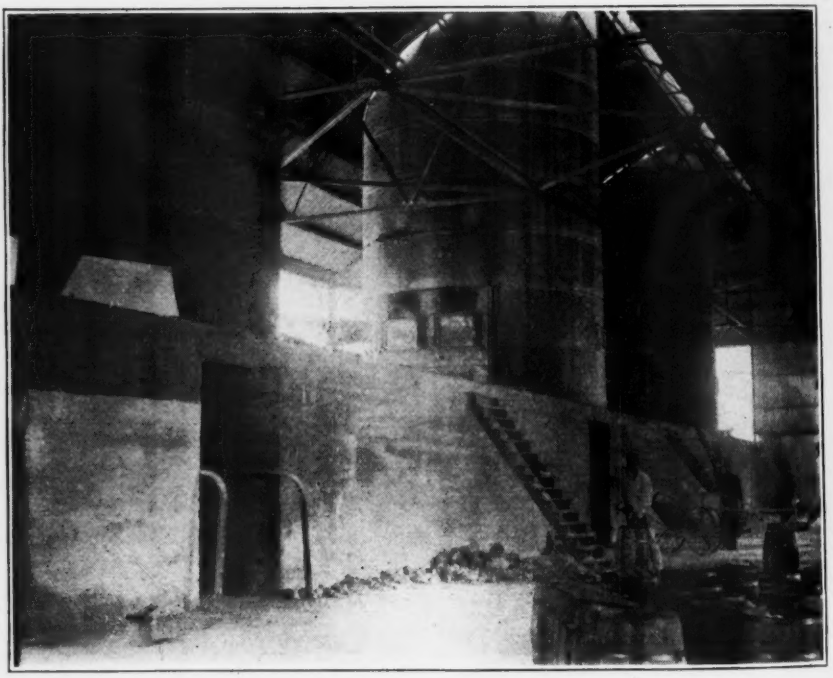
A View of the Quarry

View of the Packing Department

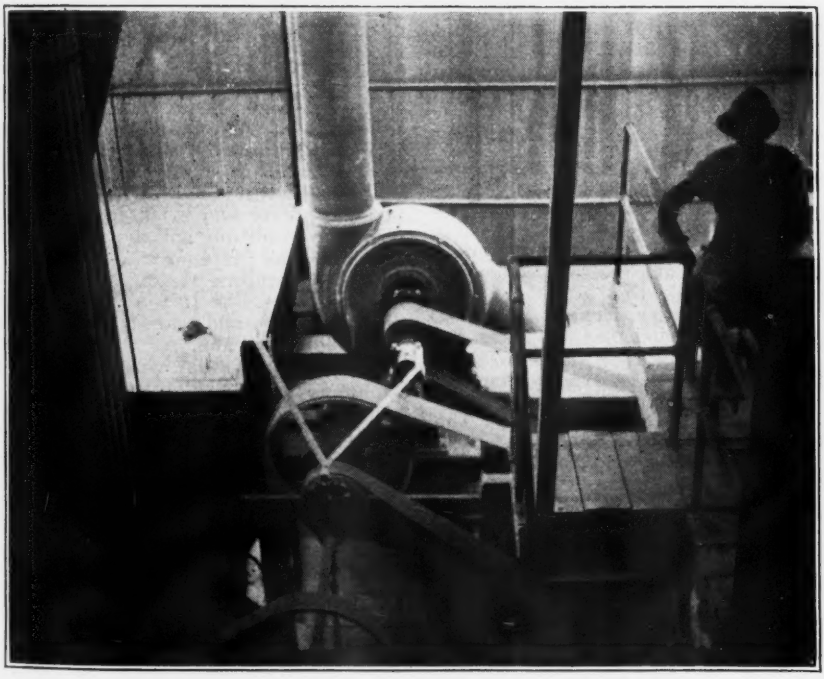
The quarry has been opened up with a face of 30 feet in height. The face will soon be extended to a half mile in length. There is very little stripping necessary, and the quarry is so laid out that very economical quarry costs have been effected. With a large acreage there is practically an unlimited supply of stone.

A number 4 Keystone well drill is

View Taken in Hydrating Department



Two Interior Views of Burning and Hydrating Departments



Top View Shows Power Plant, While Lower View Taken in Hydrating Department

used to sink 6 inch holes from the top to the floor of the quarry. Secondary drilling is handled by a Sullivan rotator air drill. Air is supplied by a Chicago pneumatic direct connected air compressor. The stone is hand sledged, and all the one man stone is loaded into 2 yard Koppel steel cars and transported to the kilns by a 7 ton Whitcomb gasoline locomotive.

Three direct flame wood burning shaft kilns of 600 barrels capacity each per day produce a uniform product. With a supply of wood sufficient for 50 years' operation the Batesville White Lime Company will be able to maintain a position which few lime companies in the country enjoy. The lime, after burning, is drawn direct from the kilns into steel carts to be cooled. After cooling it is hauled by storage battery stucks either to cars for bulk loading or to the hydrating plant or to the lime crushing plant for crushing, screening and packing.

The lump lime is packed mechanically. It is dumped from the steel casts, after coming from the kilns and cooled, into a number 1½ Sturtevant rotary crusher which reduces it to a uniform size of 2 inches. The 2 inch product goes into air tight steel tanks each of 3000 barrels capacity where it is bagged and barrelled by Howe packers. The fines are all screened from the lump product and delivered to the hydrating plant. In this way each bag or barrel contains a product of uniform size.

The lime to be hydrated is first passed through a number 1 Sturtevant crusher where it is finely ground. It is then elevated to the ground lime storage tank of 70 tons capacity. From this tank the product passes into a six-cylinder Kritzer hydrator. This machine scientifically slakes the lime when the proper predetermined amount of water to exactly hydrate is added. The product comes from the hydrator absolutely dry. The water is admitted in a spray to the stack of the hydrator, through which the heat generated by the chemical reaction is carried off, and this not only keeps the light hydrate from being drawn up the stack, but the water in turn is preheated, thus assisting the action of hydration. Revolving heaters or paddles assist the movement of lime and water through the series of six cylinders, thoroughly mixing the oxide with the water and insuring complete hydration and absolute drying, so that the material is discharged to a screw conveyor at the bottom as an impalpable flour.

This discharge from the hydrator passes through a Raymond mill where any core, unburned material or foreign substance of any kind is separated and discharged, permitting the pure white, fluffy hydrate to be raised in the air separators to a 15 ton air tight steel storage tank. The hydrate is fed by gravity from this storage tank into a 4 tube Bates packer. Power for the hydrating plant is supplied by a Fairbanks Morse type Y 100 H. P. oil engine.

In this modern plant chemical and structural lime, chemical and structural hydrate, and crushed and sized quicklime are produced. Domestic hydrate is marketed in 10 pound packages. Hydrated lime is marketed in 40 and 50 pound kraft bags. Crushed and sized quick lime is marketed in liquid tight 180 pound barrels and in moisture proof paper lined jute bags.

The officers of the Batesville White Lime Company are: W. W. Fischer, President; W. N. Fry, Vice President; W. F. Perrin, Secretary; G. T. Weigart, Treasurer, General Manager and Purchasing Agent. C. B. Teague and C. Morris are Superintendents.

New Haiss Addition

The George Haiss Manufacturing Company is now completing an addition to its plant by a one story building, 150x225 feet and 28 feet high equipped with a mezzanine floor of steel, concrete and brick construction. The new addition will be used as a machine and assembly shop. It is equipped with one 15 ton 50 foot span electric crane, one 10 ton 50 foot span electric crane, and one 10 ton 25 foot span electric crane.

This building will give the Haiss Company an additional floor space of 40,000 square feet for the assembly of wagon loaders and the crawler attachments for Fordson tractors which were brought out by the Haiss Company last year.

The building is the last word in shop design, light being obtained from windows on four sides and skylights overhead. It will be heated by hot air vents which can be controlled to allow as much air to circulate as is desired. In the summer time these vents will be used for cooling the plant.

Analyzing Freight Rate Problems In the Non-Metallic Industries

Written Expressly For Pit and Quarry By L. E. Whitney

THIS is the third of a series of articles by Mr. Whitney, who is a member of the firm of Gorman and Whitney, traffic advisers, who are conducting a special investigation for Pit and Quarry in certain freight rate matters as they pertain to conditions in the non-metallic industries.

Freight rates have such a bearing upon the market for products in the non-metallic industry that a careful analysis and exposure of some of the inconsistencies as they actually exist will be of interest to our readers. Freight hauls are usually short in our industry so that adjustments are peculiarly local. There is a rate relationship, however, and some of the conditions to be described by Mr. Whitney as existing in a certain territory may also exist in yours.

Readers are urged to send to Pit and Quarry any freight rate problems and Mr. Whitney will analyze the problem and make his recommendation. It may be that you want to know if your rates are in line. Any and all problems submitted will be dealt with expeditiously.

Editor.

Can the shippers of sand, gravel and stone in Western Territory stand an increase of 7½ cents per ton in their freight rates without seriously impairing their distribution? Or can shippers of lime, cement and plaster stand an increase of 20 cents per ton without injury to the industry? This is a concrete proposal that has been suggested by the Western carriers to be heard by the Interstate Commerce Commission at hearings to be held in Chicago, Illinois, starting September 8th.

The plea has been made by these Western carriers that their income is considerably below the standard of 5¾ per cent, which the Commission has set as a reasonable return on the value of their investment. In this connection a statement has recently been filed with the Commission by representatives of these Western carriers of which the following is an excerpt:

"As a practical means of carrying this emergency program into effect the carriers are proposing general advances in freight rates which approximate 5 per cent maintaining established rate relationships. In the instance of certain commodities the carriers will propose, as a matter of expediency that the percentage of advance be converted into one applicable in an equal amount to all freight rates. As a few illustrations: On grain they will propose a uniform advance equivalent approximately to 1 cent per bushel; on coal, 15 cents per ton; on clay, gravel, sand and stone, 7½ cents per ton; on cement, lime and plaster, 20 cents per ton."

There is a favorable public attitude toward the carriers in support of the idea that they should be allowed sufficient earnings to maintain efficient transportation service; but when a concrete proposal such as the present one is made, every one seems imbued with the idea that the other fellow's freight rates are the ones that should be increased.

There can be no doubt that the farming interests are going to be well represented at these hearings to combat any increase in rates on farm products, particularly on grain, and it seems entirely likely that they may be successful in preventing any increase in such freight rates. Because farm products represent a very considerable portion of the tonnage of the Western carriers, it seems reasonable to believe that if these commodities are to be excepted, then other commodities must bear a larger share of the burden of such increases, and the figure of 7½ cents per ton proposed on sand, gravel and stone would naturally be increased, as well as the figure of 20 cents per ton proposed on cement, lime and plaster.

What is true of the representation of the grain interests in this hearing will undoubtedly be true of all other industries affected by this proposal to increase freight rates in Western territory, and it is of the greatest importance to producers in the non-metallic industries to see to it that they are well represented.

The carriers vigorously contend that they are operating on the most economical basis and that every possible measure to conserve present revenues has been adopted. In view of the fact that every effort will be made by the farming interest to except products of agriculture from the proposed increased rates, and it is common knowledge that such efforts will include the use of influence along political lines, it is important to bring to the attention of the Commission at this hearing any facts which would prove that the products of agriculture do not now bear their proper share of the burden of transportation costs.

No one has a desire to undermine or attack favorable transportation conditions enjoyed by any industry; but when in a hearing of this sort shippers in the non-metallic industry are liable to find themselves bearing an undue share of the cost of transportation, it is certainly fair to consider the conditions surrounding any other industry in order to determine whether or not any particular industry is bearing its fair share of transportation costs.

Sand, gravel and stone, especially in the lower grades are inherently short haul traffic, and under the present freight rate adjustment these commodities are frequently bearing transportation charges that exceed the value of the goods shipped. These commodities are among the heaviest loading tonnage the carriers handle; loss and damage claims are practically unknown, and they are hauled in the cheapest character of equipment. Under such conditions these commodities should rightly bear only the lowest of transportation charges, and any proposal to increase freight rates on them should be adopted only as a last resort.

There are special privileges granted to shippers of grain and grain products in Western territory that are very expensive to the carriers, and the advisability of continuing such, in the writer's opinion, should first have consideration before other commodities than grain, that do not enjoy such privileges, should have their freight rates advanced.

One such special privilege accorded shipments of grain is known as transit. Under this arrangement a car of grain may be stopped at a milling point and made into flour or a cereal food preparation, and the manufactured article, whether flour or a cereal food, reshipped at the balance of the through rate from point of origin to destination.

The cost to the carriers of the switching service in according this transit privilege, as well as the cost of policing the service, is a very considerable drain on the earnings. But, in addition to this, the fact that the manufactured product moves out at the balance of the raw material rate to destination, is, according to these articles, that these freight rates are not compensatory to the carriers.

Does not the contention seem more reasonable that the practice of allowing the grain interests to ship manufactured food products at the raw material rates, as well as the expensive service accorded in connection with this privilege, should be discontinued, than that other industries should be asked to bear an additional burden in the way of higher rates? Transit is not the only privilege accorded the grain industry at the present time, but it is typical of the preferential treatment accorded the farming interests.

Special commodity rates are accorded fruit and vegetable shipments, even in the face of the fact that such shipments involve tremendous loss and damage claims, require special refrigeration equipment for handling, and require the speediest train service. It is a well-known fact that the carriers pay very considerable claims on market decline for failure to reach markets on schedule with fruit and vegetable shipments.

Why should a manufacturer of alcohol at Pekin, Illinois, be allowed to ship in blackstrap molasses, which enjoys very low freight rates, manufacture this into alcohol and ship out this commodity at the balance of the blackstrap molasses rate to destination?

The tariffs of the carriers are filled with instances of such preferential treatment as the foregoing favoring still other industries than those mentioned, but this is sufficient to show that the non-metallic industry could consistently ask the Commission to investigate the extent to which these privileges accorded favored interests are a drain upon the carriers' revenues before commodities shipped by this non-favored industry should bear an increase in transportation costs.

Interesting and Efficient Methods Of a Modern Lime Operation

Written Expressly For Pit and Quarry by George Ransom

OPERATIONS of the plant of the Connecticut Lime Company at Canaan, Connecticut, are greatly influenced by the circumstance that the property covers about one hundred and fifty acres. One consequence of this is that there is plenty of room for any desired track layouts and structures and another is that considerable distances have to be covered in the transportation of stone, etc. The quarry has now been worked for about fifteen years and, although the kilns were originally close to the point where the rock was taken out of the ground, these operations are now about a quarter of a mile apart.

Under these conditions, it is interesting to see how the means of transportation have been developed; for although there are numerous other details worthy of note which will be presented later, the particular features resulting from the rather large area covered constitute, perhaps, the outstanding characteristics of this property. Figure 1 shows the general arrangements in diagramatic form.

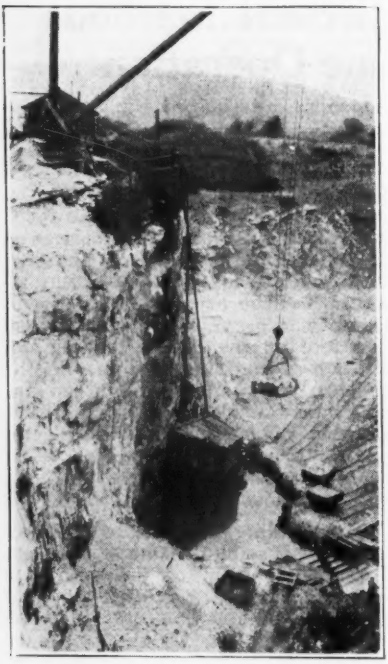
Handling Materials

At the present time a considerable area is being stripped of soil in order to extend the quarry. The material thus secured, together with waste from the quarry in the form of chips and dust, is being used to construct a grade incline from the quarry to the kiln. This will be a great labor saver because at present the stone is dumped into cars which are hauled to the foot on the incline leading up to the top of the kilns by a gasoline locomotive. Here they are pulled up to the kilns by means of a Lidgerwood electric hoist. This arrangement takes three men and $180.00 per month of electrical power, amounting to from $5500.00 to $6000.00 per year.

By building the grade incline, it will be possible to hoist the stone from the bottom of the quarry and dump it into cars at the top of the grade incline. The gasoline locomotive will then be able to haul it directly to the kilns, thus eliminating the hoist and the three men.

Another very ingenious arrangement for saving labor, for which Mr. William T. Wallace, the superintendent, is also responsible, is for storing surplus stone. The quarrying, being

Top of Kilns With Storage Shed in Foreground



Tracks Leading to Bottom of Hoist Where Stone is Hoisted in Boxes which are on the Cars

an outdoor operation, is subject to interruptions from changes in the weather, of which summer heat is not the least troublesome. It is consequently very desirable to have a supply of surplus stone on hand, but it is equally desirable that the storing should not involve any avoidable labor cost.

To meet these requirements Mr. Wallace has constructed a track on a narrow embankment about fifteen feet high from which the cars can easily be dumped. At the bottom of this embankment is another track parallel to it at a distance of about ten or fifteen feet. Stone which has been dumped off the top of the embankment is as easily picked up at the bottom as anywhere else and can be loaded into cars standing on the lower tracks.

A further improvement which Mr. Wallace intends to make during the summer is to build a wall about two feet high along the lower track on the side toward the embankment and fill in with refuse. The stone dumped off the top of the embankment will thus be accumulated along the top of the low wall thus avoiding much stooping and lifting by the men loading the cars on the lower level and increasing their efficiency. This simple arrangement of tracks saves the labor of six to eight men for unloading alone in addition to the

Showing Arrangement of Tracks on Quarry Floor Leading up to the Breast

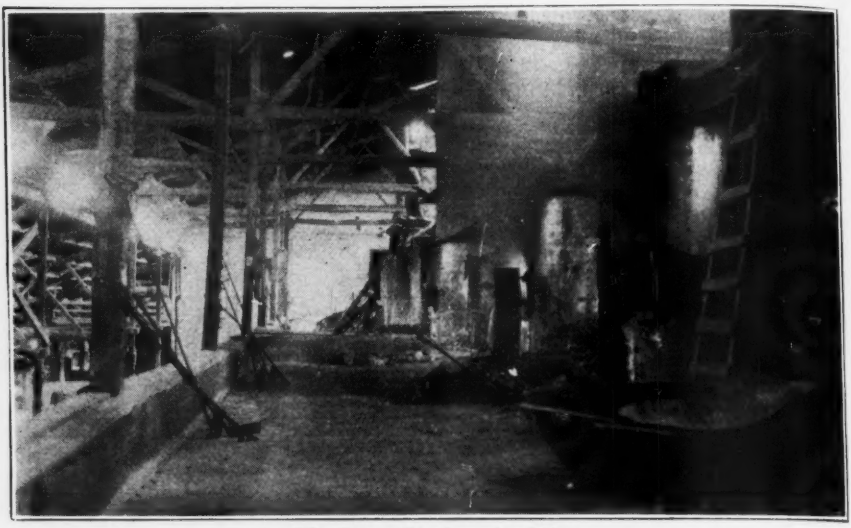
savings in loading which will be made when the two foot wall has been completed along the bottom.

The track layout has been very carefully developed with a view to convenience and the reduction of carrying materials and tools by hand. This is shown in Figure 1, and applies not only to the narrow gauge tracks but also to the standard gauge spurs from the main line of the Central New England Railroad over which the finished product is sent out and over which the coal, barrels, etc., are brought in. Special attention should be called to the tracks leading directly to the blacksmith shop to facilitate the repair of cars and the transportation of tools, and also to the garage for the gasoline locomotive. These tracks are shown in the illustrations and Figure 2.

The garage building itself is of interest both on account of the convenience of its arrangement as shown in the accompanying floor plan of Figure 2, and the economy of its construction. In the first place there are two tracks, one for each locomotive. Under one of the tracks is a pit for making repairs. The tracks do not extend all the way to the back of the building, but leave sufficient space for the storage of an automobile which gains entrance by a side door and is parked at right angles to the engines. There is a work bench along

One Group of Outdoor Transformers for Stepping Down Three Phase Current from 6600 to 220 Volts

View of Kilns Showing Coal Piles and Trestle



The Firing Platform for Kilns

one side, and it is the intention of Mr. Wallace to have a differential pulley on an overhead track at right angles to the engines to provide for easily moving heavy parts to the bench. Careful attention has also been given to providing adequate window space so as to secure good lighting.

The walls of the building are of concrete and stone, one foot thick. Wooden forms were built for only two sides at a time, and the exposed ends were kept damp until they could be moved for the other two walls. The lumber was then used for the roof. By following this method the cost of the whole building amounted to only three hundred dollars.

Heat is provided by a salamander stove which, on account of the thick walls, is adequate to keep the radiators of the gasoline locomotives and automobile from freezing even during the very severe winter weather experienced in this mountainous region.

Quarry

The stone obtained here is dolomite. The breast of the quarry is seventy-five feet high. The quality of the material is such that there is no waste except from chips which must be removed before dumping into the kilns which they tend to clog up.

Drilling is done by an electrically driven Loomis blast hole drill, which

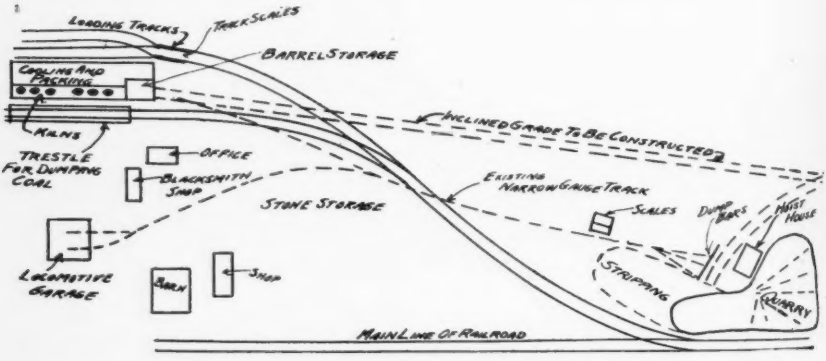


Figure 1—Layout of Quarry and Buildings

makes a seven inch hole. Holes are drilled twenty feet back and fifteen feet apart to a depth of five or six feet below the floor of the quarry. This breaks the stone off so as to leave a good level floor. Blasting is done with Red Cross and Gelatin 5x8, 40 per cent dynamite. There are only about two blasts per year, at each of which it is intended to loosen sufficient stone for about one hundred thousand barrels of lime.

The extra large pieces are broken up by Ingersoll-Rand and Sullivan jack hammers. One man is kept at this work all the time which, as a general thing, seems to be sufficient. Of course, this involves some secondary blasting. The ordinary pieces are broken up by hand with sledge hammers into sizes not exceeding something like one cubic foot. As will be seen in the illustrations, there are a number of tracks on the floor of the quarry extending from the bottom of the hoist and spreading out fan-shape to the breast of the quarry. Each quarryman has his own track and car into which he throws the stone, most of which he has broken with his sledge. For this he receives $0.25 per ton and on the average makes from six to eight dollars per day.

When a car is loaded, it is run over to the hoist; the removable box containing the stone is pulled up to the surface and dumped into the dump cars, after which it is weighed on the scales, and then taken either directly to the kilns or to the storage place. During the summer months the quarrymen and those directly concerned with them, work from 4 a. m. until noon on account of the intense heat and glare.

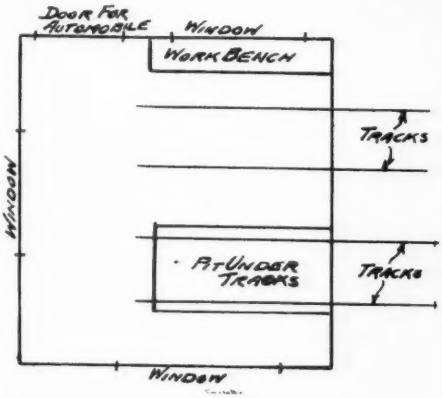
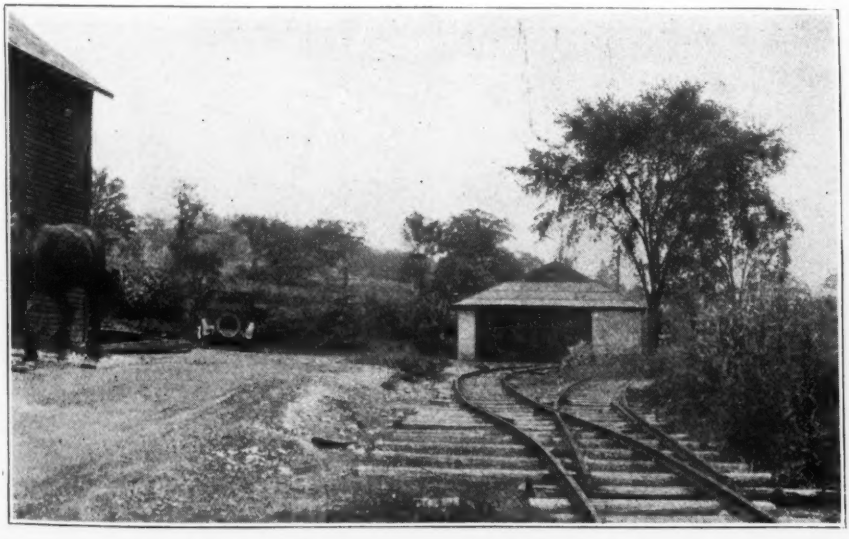


Figure 2—Diagram of Locomotive Garage

The hoisting equipment for elevating the stone from the quarry is a Lidgerwood hoist with a 30 H. P. General Electric 220 volt induction motor. A 9x8 Ingersoll-Rand compressor, to supply air for the jack hammers and operated by a similar



The Gasoline Locomotive Garage

Steam Shovel Stripping for Quarry Extension

motor, is located in the same building with the hoisting machinery. There are two centrifugal pumps for pumping out the quarry, one 3-inch Cameron pump run by a 10 H. P. motor and one 3-inch Davidson pump run by a 30 H. P. motor located in a building in the bottom of the quarry. In addition to this there are two gasoline locomotives of which one is a 7-ton Plymouth, and the other a 5-ton Whitcomb. The stripping for development is being done with a Bucyrus steam shovel.

All this equipment, laid out as explained and shown in the diagrams and pictures, is, with the help of forty-two men, sufficient to keep six kilns in continuous operation. These kilns, of which 5 are steel and 1 cement, are 40 feet high, 14 feet in diameter and are fired from two sides.

Storage Shed and Cooling Floor

The best grade of gas coal is used. It is brought in over a standard gauge spur and on to a trestle parallel to the line of kilns and dumped, thus reducing the labor of handling to a minumum. Mr. Wallace has introduced what he considers a great improvement in these kilns by equipping them with cement tops. The steel tops formerly used had a life of only about two years, whereas the cement tops seem to have a life equal to that of the kiln itself.

At present the output is from 120 to 170 barrels per kiln per day (24 hours) with a coal consumption of 5 tons per kiln per day. This requires two firemen and two kiln tenders per twelve hours. The volume of output and twelve hour day will probably be changed in the near future as a result of the introduction of improved methods which Mr. Wallace is about to put into operation. As soon as the possibilities of this change have been demonstrated, the results will be reported in these columns. Lump lime forms the bulk of the shipments from this plant, although some agricultural lime is made.

Formerly the company had its own cooperage shop, but that has been given up as it has proved to be more economical and it simplifies the labor problem, in this region of great labor scarcity, to buy the barrels. At the present time tongue and groove barrels are purchased from the International Cooperage Company.

The arrangement of standard gauge tracks, storage space for barrels and lime are all shown in Figure 1. The efficiency with which this has been done is obvious from an inspection of this diagram. It is also obvious that the plant is completely electrified except for the steam shovel and the gasoline locomotives. The shovel will be dispensed with in a few months as soon as the present stripping operation is completed as it is estimated that enough stone will then be uncovered to work the quarry for thirty years. Central station current at 6600 volts, 3 phase, is stepped down to 220 volts by means of outdoor transformers. There are two such groups, one near the kilns and one near the quarry.

Asbestos In 1924

The production of asbestos in 1924, as reported by producers to the Bureau of Mines, Department of Commerce, amounted to 300 short tons, valued at $42,526. These figures comprise 173 short tons of chrysotile asbestos, valued at $33,941, mined in Arizona, California, and Montana, and 127 short tons of amphibole asbestos, valued at $8,585, mined in Georgia and Maryland.

The imports of unmanufactured asbestos amounted to 183,250 short tons, valued at $3,602,945.

Present Incline Leading to Top of Kilns

The Perfect Classifier

The Perfect Classifier, manufactured by the Perfect Classifier Company, is a machine which fills the long felt need of a machine for cleaning non-metallic minerals of all kinds. It will wash coal, limestone, phosphate, rock or any material to be washed and classified. It is suitable for the sand and gravel producers who need to free their sand or gravel of mud balls, sticks, leaves, coal, lignite, etc., leaving the material thoroughly scrubbed and washed.

The machine has two screw conveyors, right and left, operating at slightly different speeds, and producing the scrubbing effect. It is supplied with a high water level that keeps the material submerged a sufficient time to free it of mud or sticky clay. Water is applied at the most advantageous points under sufficient pressure to cause the light material to pass off with the overflow, leaving the clean sand or gravel to be discharged at the high end of the conveyors.

With 14 inch conveyors the machine has the capacity of from 40 to 60 tons of gravel per hour, depending upon the speed of the conveyor and the pressure at which the water is supplied. It needs no attention while operating. It need only be set at the proper speed to get the desired tonnage. The necessary water pressure to clean the material is all that needs attention. If feed stops. no rubbish is carried over to the stock; if overfed, the surplus material is wasted through the overflow, but the machine continues to deliver its maximum tonnoge of clean material.

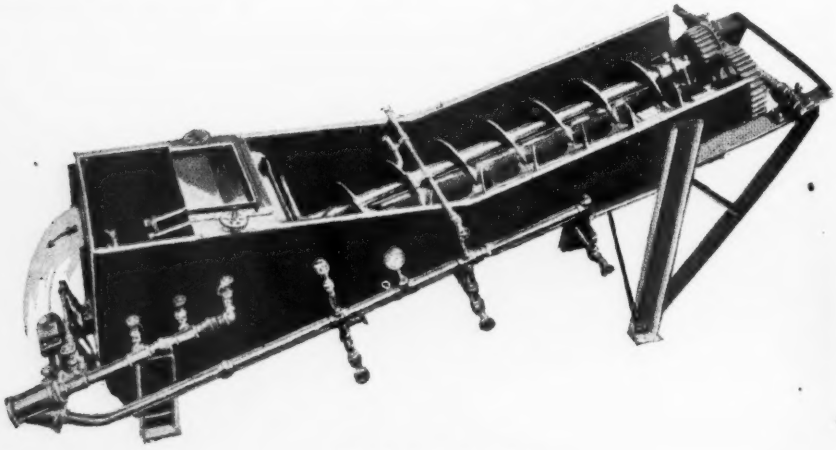
A New Explosive

Following many experiments both in the laboratory and in the field, the Hercules Powder Company has announced a new high explosive, Hercules Special Number 3. It is especially designed for underground mining where fumes are important, and it is adapted to underground work on ore, shale, clay, gypsum, and, because of its non-staining qualities, for use in salt mines.

Hercules Special Number 1 and Special Number 2 were two of the important contributions of recent years to the blasting industries. Where these explosives are suitable, a 15 per cent reduction of blasting costs by their use is not uncommon. They are most widely adapted to quarry and open pit work. The economy of Special Number 1 and Number 2 naturally appealed to underground miners. They are used successfully in some underground mines, but their fumes make them unsuitable for others.

Spinks Changes Name

Announcement has been made of the change of the Spinks Supply Company, Inc.. of Memphis, Tennessee, to Universal Equipment Company, Inc. With the change of name is also a change of address to 1444 Riverside Boulevard, Memphis.



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Cleveland Branch:
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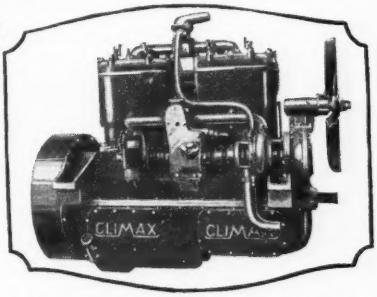
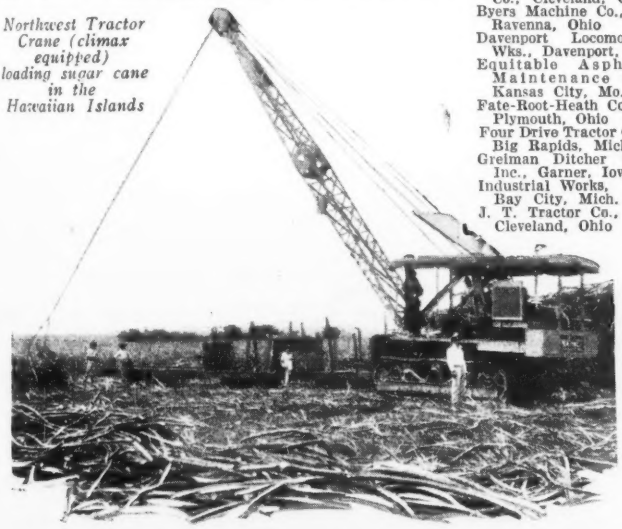
Cleveland, Ohio

Denver, Colo.:
The Hendrie & Bolthoff Mfg. & Supply Co., 1621-49 17th St.



Northwest Tractor Crane (climax equipped) loading sugar cane in the Hawaiian Islands



Climax Engines are used as Standard Equipment by:

Bay City Dredge Works, Bay City, Mich.
Brown Hoisting Mach. Co., Cleveland, Ohio
Byers Machine Co., Ravenna, Ohio
Davenport Locomotive Wks., Davenport, Ia.
Equitable Asphalt Maintenance Co., Kansas City, Mo.
Fate-Root-Heath Co., Plymouth, Ohio
Four Drive Tractor Co., Big Rapids, Mich.
Greiman Ditcher Co., Inc., Garner, Iowa
Industrial Works, Bay City, Mich.
J. T. Tractor Co., Cleveland, Ohio
Kennison Mfg. Co., Solomon, Kans.
Keystone Driller Co., Beaver Falls, Pa.
Lidgerwood Mfg. Co., New York, N. Y.
Link-Belt Co., Chicago
Locomotive Crane Co., of America Champaign, Ill.
McMyler-Interstate Co., Cleveland, Ohio
Mid-West Locomotive Wks., Cincinnati, O.
Mundle Mfg. Co., Peru, Ill.
J. S. Mundy Hoisting Engine Co., Newark, N. J.
National Hoisting Eng. Co., Harrison, N. J.
Northwest Engineering Co., Chicago, Ill.
O. K. Clutch & Mach. Co., Columbia, Pa.
Orton & Steinbrenner Co., Chicago, Ill.
The Osgood Co., Marion, O.
Parsons Co., Newton, Ia.
Rix Compressed Air & Drill Co., San Francisco, Calif.
Russell Co., Massillon, Ohio
Vulcan Iron Works, Wilkes-Barre, Pa.
Geo. D. Whitcomb Co., Rochelle, Ill.
Wisconsin Farm Tractor Co., Sauk City, Wis.
W. T. Young Engine Co., Oil City, Pa.

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HOISTS

Large quantity late model American double-drum with attached swinging gear, capacity 6000 pounds; on a single line at 162 ft. per minute; either hand levers or levers banked in quadrant. Can furnish either 37 H.P., 440 or 220 volt, A.C., 60 cycle, 3 phase, alternating current, or 35 H.P., 220 volt, direct current, or can furnish without electrical equipment suitable for gasoline or belt drive.

CARS

20—36-in. ga. Continental, 4 yd. heavy duty, rebuilt like new.

15—Lakewood 30-in. ga., V shape, 1½ yd., all steel Dump Cars.

STEAM SHOVELS

3—78C late '23 models, 30-ft. boom, 19-ft. dipper stick, 3-yd. dipper, one on railroad trucks, two on caterpillars.

1—Type "B" Erie on caterpillars, ¾ yd. bucket.

DERRICKS

Large quantity late model American Stiff Leg Derricks, mast 14x14x40 ft., booms 14x14x60 ft., stiff legs 14x14x50 or 60 ft., sills if desired, with 12 ft. steel bull wheel, for hook work or bucket operation.

Large quantity late model American Stiff Leg Derricks, mast 16x16x40 ft., boom 14x14x80 ft., trussed with hog rods, legs and sills 14x14, with 16 ft. steel bull wheel, arranged for hook work or bucket operating.

LOCOMOTIVES

2—Porter std. ga., saddle tank, 14x22 cylinder, weight 42 tons, like new, only one year of service, shop Nos. 6770, 6853.

1—Davenport std. ga., 20 ton, 10x16 cylinders, saddle tank. No. 1497.

3—Porter 36-in. ga., 18 ton, saddle tank, 10x16 cylinders, rebuilt like new. Nos. 4619, 4667, 6805.

2—7 ton, 24-in. ga., Plymouth, gasoline.

5—3 ton, 24-in. ga., gasoline, 2—Plymouth, 3—Whitcomb Fordson.

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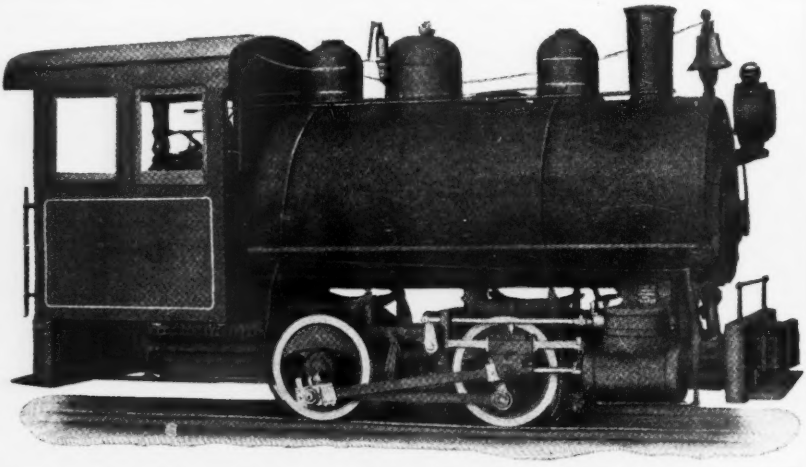

2—Standard Gauge 11" x 16"—22 ton, 4 Driver saddle tank locomotives, 170 pounds steam pressure; steam brakes. Completely rebuilt. Immediate shipment.

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(Est. 1889) ATLANTA, GA.

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STEAM SHOVELS

1—Standard Type "B" Erie. Shop No. 1484, mounted on caterpillars, ¾-yd. dipper.
1—Bucyrus 80-B Stripping Shovel. Shop No. 4002. New 1923.
1—Bucyrus 50-B Coal Loading Shovel. Shop No. 3744. New 1922.
1—95-C Bucyrus. Shop No. 1235, 4-yd. or 5-yd. dipper.
1—Model 80 Marion. Shop No. 1312, 4-yd.
1—Model 75 Marion. Shop No. 2112, 2½-yd. or 4-yd. dipper.
2—70-ton Bucyrus. Shop Nos. 977 and 1233, 2½-yd. dippers.
2—70-C Bucyrus. Shop Nos. 1195 and 1197, 2½-yd. dippers.
1—70-ton Bucyrus. Shop No. 939, railroad type, 2½-yd. dipper.
3—Model 60, Marion. Shop Nos. 1995, 1999, 2059, railroad type, 2½-yd. dipper.
2—Model 60 Marion. Shop Nos. 1301 and 2238, 2½-yd. dippers.
2—60-C Bucyrus. Shop Nos. 1286 and 1388, 2½-yd.
1—45-C Bucyrus. Shop No. 1202. Railroad type, 1¾-yd. dipper.
1—18-B Bucyrus. Shop No. 1870, traction wheels, ⅞-yd. dipper.
1—Standard Type "B" Erie. Shop No. 206 on traction wheels, ¾-yd. dipper.
1—Type "B" Erie, Shop No. 929, mounted on traction wheels, ¾-yd. dipper.
1—14-B Bucyrus traction, ⅝-yd. dipper.
1—Model 31 Marion. Shop No. 3613 with Traction Wheel or Railroad Type Mounting.

SIDE DUMP CARS

42—16-yd. Western Air Dump Cars.
39—12-yd. Western Air Dump Cars, 19-ft. beds, box girder doors.
12—12-yd. Western Air Dump Cars, 19-ft. beds, box girder doors, vertical dump cylinders, 50,000-lb. cap. trucks.
6—12-yd. Western Air Dump Cars, Truss-rod doors, 26-ft. beds.
3—12-yd. Oliver Hand Dump Cars.
6—8-yd. Western, 36-in. gauge, double truck cars.
1—4-yd. Western 36-in. gauge, steel beam car.
13—4-yd. Western 36-in. gauge cars.
8—4-yd. Continental 36-in. gauge cars.
8—2-yd. Western, 36-in. gauge.
42—1½-yd. Western, 24-in. gauge.
12—1½-yd. Western, 24-in. gauge.

STEAM SHOVEL PARTS

1—Boom for Marion 60 or 61 Shovel, length 35-ft. 22-ft. dipper arm, 1½-yd. dipper, long jack arms, etc.
1—19-ft. 6-in. boom, 12-ft. sticks and ditcher bucket for Type B Erie Shovel.
1—22-ft. dipper stick for Type B, Erie Shovel.

LOCOMOTIVES—Standard Gauge

1—19x24 Baldwin 6-wheeled Saddle Tank. Shop No. 42553, built 1918. Weight 67 tons, air brakes, 180 lbs. steam pressure.
1—18x24 Brooks 6-wheeled Switcher, with tender. Shop No. 1778. Weight 50 tons.
1—17x24 Davenport 6-wheeled Switcher, with tender. Shop No. 1268. Steam pressure 180 lbs. Weight, 47 tons.
1—17x24 Schenectady 6-wheeled Switcher with tender. Shop No. 2956. Weight 44 tons.
1—16x24 Vulcan 4-wheeled Switcher, with tender. Shop No. 1764. Steam pressure 180 lbs. Weight 40 tons.
1—16x24 Davenport 4-wheeled Switcher, with tender. Shop No. 860. Steam pressure, 170 lbs. Weight 38 tons.
1—16x22 C. M. & St. P. Ry., Class J-2 4-wheeled Switcher. Weight, 32 tons.
1—13x18 Vulcan 4-wheel saddle tank. Shop No. 3163. 32 tons. Westinghouse air brakes, 180 lbs. steam pressure.

LOCOMOTIVES—Standard Gauge (Continued)

1—11x16 Davenport 4-wheelel Saddle Tank Locomotive. Shop No. 1027. Weight, 20 tons. Steam brakes.

LOCOMOTIVES—36-in. Gauge

1—11x16 Davenport Dinkey. Shop No. 710. Weight, 20 tons.
2—10x16 Davenport Dinkies. Shop Nos. 1400 and 1417. Weight, 19 tons.
1—9x14 Vulcan Dinkey. Shop No. 1675. Weight, 14 tons.
2—7x12 Davenport, 4-wheel Saddle Tank. Shop Nos. 1566 and 1567.
1—9-ton Whitcomb Gasoline Locomotive.

LOCOMOTIVES—24-in. Gauge

3—7x12 Davenport Dinkies. Shop Nos. 1202, 1411 and 1524. Weight 9 tons.
1—6x10 Davenport Side Tank Dinkey. Shop No. 1307. Weight, 7 tons.

DRAGLINE EXCAVATORS

2—Class 24 Bucyrus Steam. Shop Nos. 3445 and 3500, skids and rollers, 85-ft. to 100-ft. booms; 3½, 4½ or 5-yd. Page buckets.
1—Class 14 Bucyrus, steam operated, either coal or oil burner. Shop No. 3706, caterpillars, 60-ft. boom, 2-yd. Page bucket.
1—Class 14 Bucyrus. Steam operated. Shop No. 745. Skids, 60-ft. boom, 2-yd. bucket.

CRANES

1—Type "B" Erie. Shop No. 929, traction wheels, 36-ft. boom.
1—10-ton Industrial, 4-wheeled. Shop No. 1989, 40-ft. boom, bucket operating.
1—15-ton Brown Hoist, 42-ft. boom, 8-wheel MCB trucks. Massachusetts boiler. Shop No. 4520.
1—20-ton McMyler, 8-wheeled. Shop No. 388, 45-ft. boom, 1¼-yd. O & S clam.
1—Gantry Crane. New in 1919; 40-ft. boom, 15-ton cap., at 18-ft. radius; 7-ft. 10½-in. gauge, 12-ft. wheelbase, self-propelling. Base of boom 17-ft. above track. Bucket-operating drums. Weight, 50 tons.
1—Type B McMyler 23-ton capacity, with 50-ft. boom. Shop No. BC-2108. Serial No. 3263, 8-wheel MCB trucks, A.S.M.E. boiler.
1—Type J McMyler, 35-ton capacity, with 70-ft. boom. Shop No. BC-2376. Serial No. 3312, 8-wheel MCB trucks, A.S.M.E. boiler.

BUCKETS

1—1-yd. Class M Page Dragline Bucket.
1—1½-yd. Page Dragline Buckets.
1—1½-yd. Brown Hoist Clam Shell.
1—1½-yd. Williams Favorite.
3—Mead-Morrison 1½-yd. Clam Shells.
2—1¼-yd. O. & S. Coal Loading Clam Shells.
1—¾-yd. Type "J" Owens.

MISCELLANEOUS

1—Parsons Trench Machine, used only two months.
1—Parsons Trench Backfiller, used only two months.
1—8-ft. Austin Giant Road Grader.
1—6x10 D.C., D.D., Lidgerwood Hoist, with 36x90-in. boiler.
1—6½x10 D.C., D.D. American Hoist, with butt strapped boiler.
1—7x10 D.C., D.D. Lambert Hoist, without boiler.
1—7x10 D.C., D.D. Flory Hoist, without boiler
1—Lambert 8½x10 Double Drum with boiler.
42—No. 8 Milburn Carbide Lights, 8000 Candle Power.
7—No. 12 Milburn Carbide Lights, 12,000 Candle Power.
18—Milburn **Reliance** Carbide Lights, 1,000 Candle Power.
12—Milburn **Builders Carbide Lights,** 500 Candle Power.
1—No. 80 **Buhl** Portable Air Compressor.
1—No. 55 **Buhl** Portable Air Compressor.

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1—Type "B" Erie—on caterpillar.
1—14-B Bucyrus—on caterpillars.
1—18 Osgood—on caterpillars.

LOCOMOTIVE CRANES

1—No. 8 Browning—8 wheel, 50 or 75 foot boom.
1—15 ton Brown Hoist—traction wheels
1—7½ ton Brown Hoist—traction wheels.

GASOLINE LOCOMOTIVES

2—6 ton 24" gauge Whitcomb
2—6 ton 24" gauge Burton
1—3 ton 36" gauge Plymouth

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3—mile 24" gauge Industrial Track.

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1	40	Westinghouse, type CS.....	690
1	40	Westinghouse, MW, slip ring.....	850
5	40	Westinghouse, CX	580
1	50	Fairbanks-Morse, type BV, slip ring..	1200
1	50	Allis-Chalmers, type AN.....	1180
1	50	G. E., type I, form M, slip ring.....	900
1	50	Westinghouse, type CS.....	870
1	50	Westinghouse, CCL	690
1	50	G. E., form K.....	690
1	60	G. E., form KT	900
1	75	G. E., form K, 220 v.....	1800
1	75	G. E., form K, 2300 v.....	1800
2	75	G. E., type I, form M, slip ring.....	900
1	75	Fairbanks-Morse, type BV, slip ring..	690
1	75	G. E., form K.....	690
1	75	Westinghouse, type CW, slip ring.....	435
1	100	Westinghouse, type CS.....	870
1	100	Allis-Chalmers, slip ring, 2200 v.....	865
2	100	Westinghouse, type CW, slip ring....	350
1	250	Westinghouse, type C	850
1	250	Fairbanks-Morse, type HV, slip ring.	600
2	250	G. E., type I, form M, slip ring.....	385
1	300	G. E., type I, form M, slip ring....	1200

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1—70-C Bucyrus. Shop No. 1749. Standard gauge, railroad, 2½-yd. dipper.
1—Model 60 Marion. Shop No. 1463. Standard gauge, railroad 2½ yd. dipper (butt strap boiler).
1—18B Bucyrus, revolving. Shop No. 1764. Traction wheels, ⅞-yd. dipper.
1—Type B Erie Revolving Steam Shovel, traction wheels, standard boom, ¾-yd. dipper.
1—Model 212 Marion (revolving). Shop No. 4620. Mounted on trucks, 55-ft. boom, 34-ft. dipper stick, 1¾-yd. dipper. Only used enough to be broken in; compares favorably with new.
1—Model 28 Marion, standard revolving. Shop No. 2804, traction wheels, ⅝-yd. dipper.
1—Little Giant Railway type, standard gauge, equipped with standard boom, 1¼-yd. dipper.

DRAGLINES

1—Class 210 P & H Gasoline. No. 1349, on caterpillars. 76-hp. Twin City Engine. 48-ft. boom, 1-yd. bucket.

DRAGLINES—Cont.

1—Class 14 Bucyrus, steam operated, on caterpillars, 60-ft. boom, 2-yd. Page bucket. Shop No. 3706.
1—Class 24 Bucyrus, steam operated, skids and rollers, 100-ft. boom, 3½-yd. bucket.
1—Class 24 Bucyrus Electric Driven, skids and rollers, 100-ft. boom, 3½-yd. bucket.
1—No. 2 Monighan, steam operated, skids and rollers, 70-ft boom, 2-yd. bucket.

TRACTOR

1—5-Ton Best, caterpillar.

MISCELLANEOUS

1—¾-yd. dipper for Model 18 Osgood Shovel.

FOR RENT

2—20B Bucyrus Revolving Steam Shovels, high lift. Shop Nos. 4252 and 4307. Mounted on caterpillars; ¾-yard dippers.

The above list is constantly changing. No matter what your machinery requirements are, write us—we may have it.

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Any quantity, any size of new and relaying rails available any time from the nearest of our four great yards. **Inspected, guaranteed.** Quick delivery at lowest freight cost.

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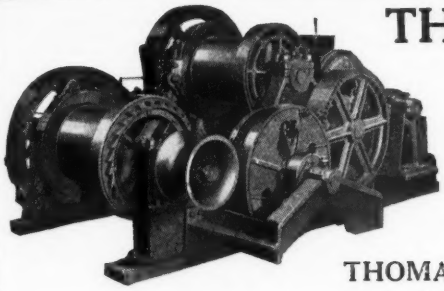

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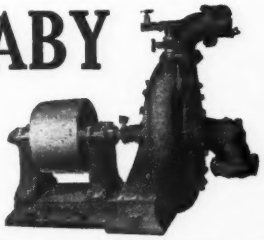

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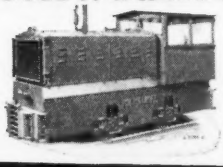

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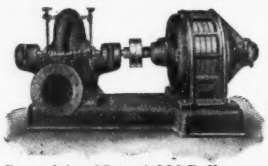

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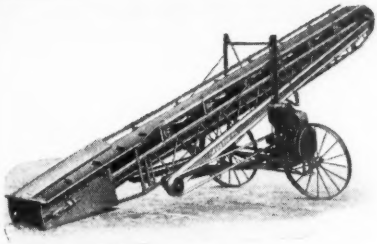

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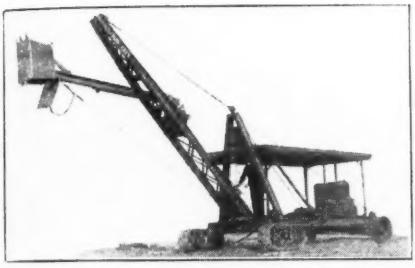

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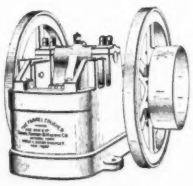

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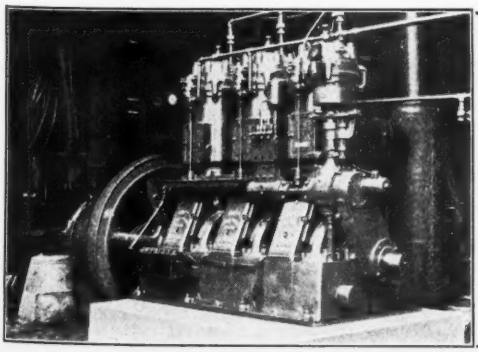

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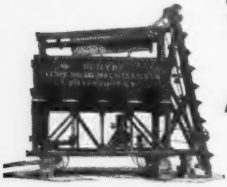

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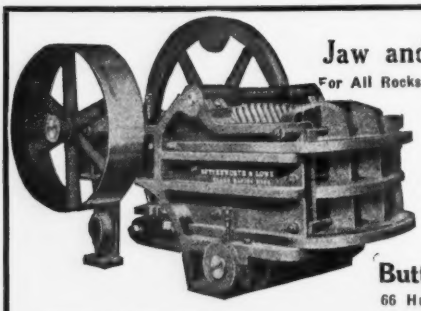
Branch Factory—Salem, N. Y.
Export Office—New York City



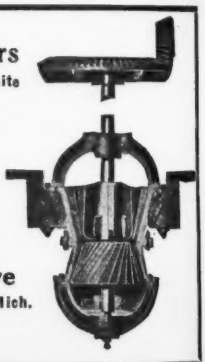
Jaw and Rotary Crushers

For All Rocks and Ores Softer Than Granite

GYPSUM MACHINERY

We design modern Plaster Mills and make all necessary Machinery, including Kettles, Nippers, Crackers, Buhrs, Screens, Elevators, Shafting, etc.

SPECIAL CRUSHER-GRINDERS FOR LIME



Butterworth & Lowe

66 Huron Ave., Grand Rapids, Mich.

Nippers—17x19", 18x26", 20x30", 24x36" and 26x42"

Rotaries—20" to 47" inside diameter. Many variations.

McGANN MANUFACTURING COMPANY, INC.

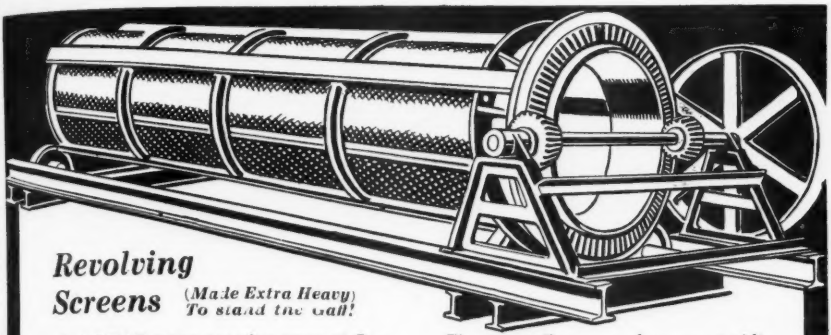
Engineers and Manufacturers

CHICAGO YORK, PA. NEW YORK

THE SCHULTHESS HYDRATOR—Built in all sizes to suit condition—

Takes lime direct from the Kiln without crushing—Lowest possible power required, about one-third the amount used by other Hydrators—Entire elimination of dust problem.

YORK Kiln | SCHULTHESS Hydrators | YORK Double Shell Dryers



Revolving Screens (*Made Extra Heavy To stand the Gaff!*

A GREAT many exacting users of Gruendler built Revolving Stone Screens claim it is the sturdiest, smoothest running, best-designed screen to be had today.

It is made in sizes to meet all requirements. Screens are extra heavy, mounted on Hardwood Timbers. This assures a straight running screen at all times. Supplied in sections, two to twelve feet long, any size perforations, either punched plate or Manganese Steel.

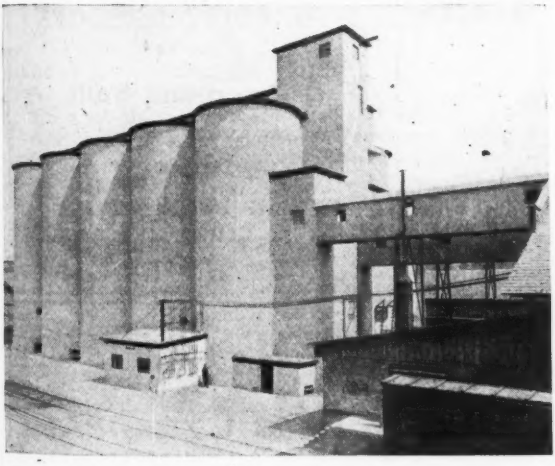
All Steel Screen with Manganese, Bevel Gears and Pinions, Tread Wheel and Rollers.

The Gruendler type of screen rapidly is becoming the choice of the foremost engineers and quarrymen. It stands up under all kinds of heavy duties and meets all screening demands. There are no shut downs.

Let us know your requirements. Our expert engineers will help you analyze your problem and secure the best equipment for the purpose. Bulletin No. 275 will be sent free. No obligation or cost.

Gruendler Swing Hammer Crushers and Pulverizers, elevating machinery, and Road Building Equipment are known for their satisfactory, economical service.

GRUENDLER PATENT CRUSHER & PULVERIZER *Company*
FIRST & FRANKLIN ST. LOUIS, MO.



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Designers and Builders of

Cement Storage
Pack Houses
Slurry Tanks
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Designs and Estimates Furnished on Request

Burrell Engineering & Construction Co.
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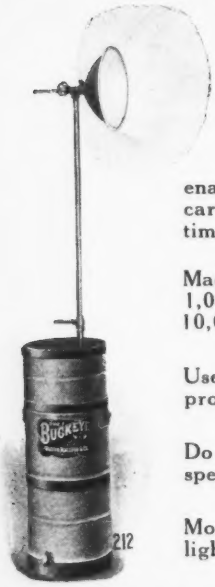

Night Lights

enable work to be carried on at night time.

Made in sizes from 1,000 to 10,000 candlepower

Use ordinary carbide procured anywhere

Do not require special carbide

Most economical lights on the market.

THE MAC LEOD CO.
Station B, Cincinnati, O.

STEEL BINS

85, 135, 210 and 300 Ton Capacities.
All-steel-hopper-bottom-self-cleaning.
Equipped with a no-jam gate.
Use BLAW-KNOX long service Clamshells.

BLAW-KNOX COMPANY
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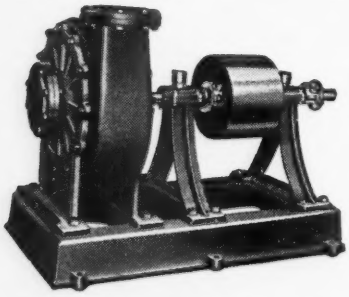
BLAW-KNOX

Lightning Pumps



Will Give the Service

It is a superior pump for sand and gravel dredging because of its greater capacity and simplicity.

A complete description of these rugged pumps will show you that they are the right pumps for your work. Write for our Pump Bulletin.

KANSAS CITY HAY PRESS CO.
KANSAS CITY, MISSOURI

HYDRAULIC DREDGES
6″ to 12″
Designed and Built
RANDOLPH-PERKINS COMPANY
38 South Dearborn Street
CHICAGO

SYMONS
Disc Crushers
SYMONS BROTHERS CO.
Railway Exch. Bldg., Milwaukee, Wis.

Los Angeles Office:
1462 Stanley Ave., Hollywood
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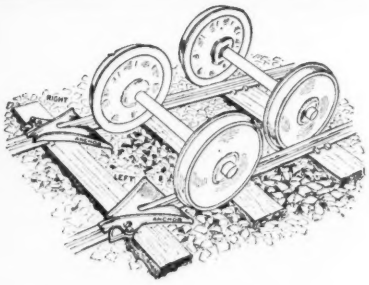


Get 'em back on the track

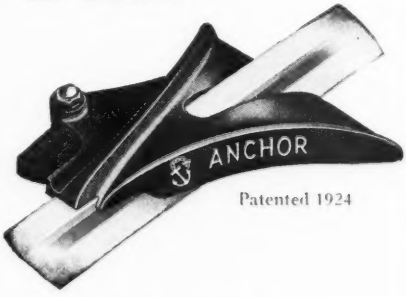
Quickly and Easily with

"ANCHOR" RERAILERS

A pair of "Anchor" Rerailers on every one of your locomotives will soon pay for itself in time saved.

The cost per pair is very small. If you deprive yourself of "Anchor" Rerailers, it is like locking the barn after the horse is stolen.

GET 'EM NOW!



Patented 1924

Manufactured by

T. H. EDELBLUTE CO.

Wabash Building, PITTSBURGH, PA.

The lightest strong pipe

THE ideal pipe for quarry use! Strong and durable enough for any service; light enough for easy handling. It is cut to exact lengths—fabricated to specifications—ready for quick installation. Every length is fitted with unbreakable forged steel connections that can't be broken in shipping, installation or service; or with bolted joints that permit deflection without leakage.

Ask for elaborate "Production Book."

American Spiral Pipe Works

CHICAGO, ILL.

New York Office:
50 CHURCH ST.

Also manufacturers of Taylor Forge Welded Pipe and Taylor Forged Steel Flanges.

TAYLOR *Spiral Riveted* PIPE

P & Q 9—11—RTG

BIGGER AND BETTER

The New 1925 Model

NELSON
FORDSON LOADER

"The Standard of Service"

Sixty to eighty yards an hour.
Self feeding without hand labor.
Slow crowding keeps buckets full.
Strong, well designed frames
Saves labor and truck time.
All work in plain sight of operator.
Swivel spout ten feet high.
Side or end loading of big trucks
Digs its own road into the pile.

Write for Catalog and Prices, or Ask your Ford Dealer.

N. P. NELSON IRON WORKS, Inc.
Passaic, N. J.

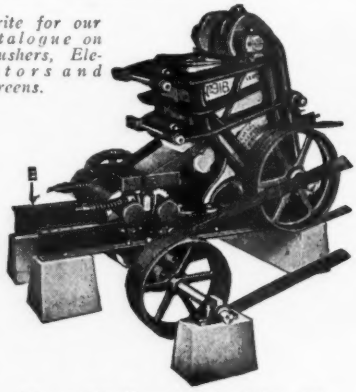
Where we lead others follow.

=New Holland=

FOR FINE CRUSHING OR RECRUSHING

The economical method of crushing fine stone is to use New Holland Crushers. They are especially adapted to fine crushing or recrushing; they reduce material to all grades down to sand. They run easily—no hot bearing—and produce the least possible dust.

Write for our catalogue on Crushers, Elevators and Screens.



New Holland Machine Co.
Franklin Street, New Holland, Pa., U. S. A.

DAKE SWINGING ENGINES

PRODUCE
Quicker Swings
More Work
Less Trouble

The experience of use has proven them—That's why they are so universally used on bull wheel derricks.

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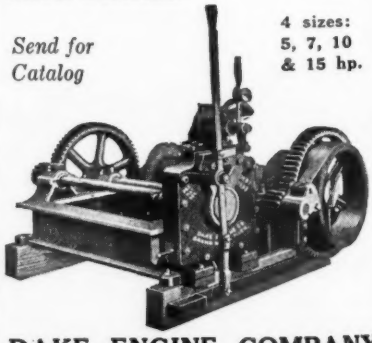
4 sizes: 5, 7, 10 & 15 hp.



DAKE ENGINE COMPANY
Grand Haven, Mich., U. S. A.

For Quarrymen Who Want to Know More About Drilling

A NEW 120-page edition of our book "Big Blast Hole Drills" is ready.

Half of this book consists of information on the drilling qualities of different rocks, methods of operation and cost data on drilling and blasting.

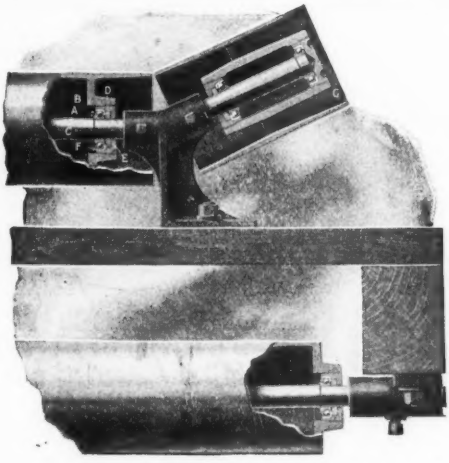
The balance of the book describes in detail the three sizes of Cyclone Big Blast Hole Drills, one of which will handle practically any quarry's drilling.

Write for a copy.

The Sanderson-Cyclone Drill Co.

Orrville, Ohio

EASTERN and EXPORT OFFICE
30 CHURCH ST., NEW YORK



7 *Reasons for Excelling*

Hardened steel "Cone" fitted on turned steel shaft.

Pressed steel "Ball Returner" Turned Steel Shaft, set screened in Idler Brackets. Oiled washer of felt or corded wool. Hardened Steel "Plug," screwed into pulley hub.

Brass plug for lubrication.

Lock screen to prevent hardened plug from turning.

Conweigh Ball Bearing Troughing and Return Idlers represent a detail improvement which affects the whole conveying system of a plant. Because of the smooth, easy service they give, belt conveyors operate with far greater efficiency.

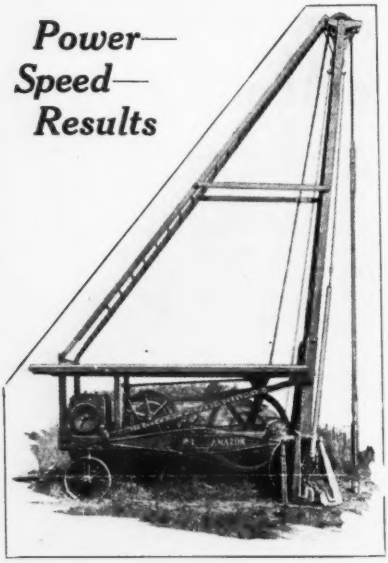
Conweigh Ball Bearing Idlers are smooth running, and durable, being made of hardened steel well reinforced. They give easy access for lubrication.

Get complete details on "Conweigh" Idlers. Made in all sizes. Write today.

THE CONVEYING WEIGHER COMPANY

90 West Street **ENGINEER & CONTRACTOR** **New York**

Power—
Speed—
Results



Machine Gun Action

Quick, True, Sure. Like the repeating fire of a machine gun. Is the likeness of the Amazon Drill's great drilling capacity.

Power, speed and results is what you want in a drill, these features combined with easy operation, durability and economy make the Amazon an ideal drill.

Send for an Amazon catalogue. It contains complete details.

THE

BURCH PLOW WORKS COMPANY

CRESTLINE, OHIO

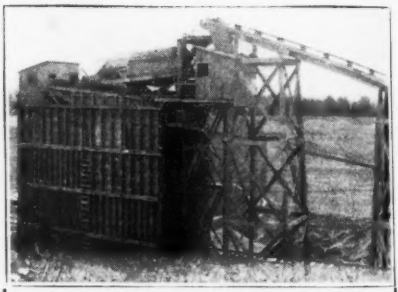
Sweet's Track Materials

Will Cut Your Operating Costs

Their light weight and portability, the ease and speed with which SWEET'S TRACK MATERIALS are laid; their sturdy strength due to their flawless and expert construction; their dependable day in and day out service under all conditions, are reasons a plenty why you should specify SWEET'S for your light track equipment.

Write for Sweet's Catalog—it tells the story

SWEET'S STEEL CO.
Williamsport, Penna.



ECONOMY, SIMPLICITY AND DURABILITY are the chief characteristics of **RELIANCE** equipment. Complete crushing, screening and washing plants ranging in capacity from **50 to 1500 Tons Per Day.**

Send for Catalogue and Prices

Universal Road Machinery Co.
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Boston—141 Milk St. New York—114 Liberty St.
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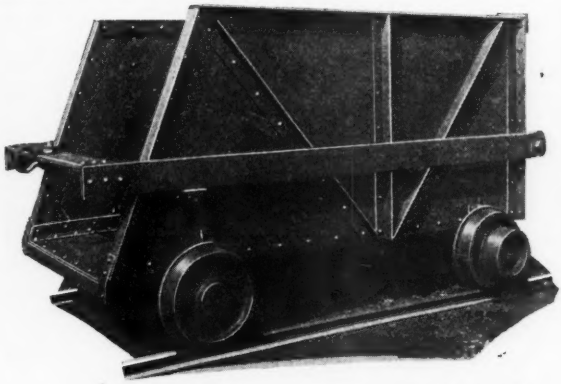
RELIANCE—"Best in the Long Run"

EASTON QUARRY CARS



Progress

Firms stand still—copy—or progress.

Those which progress are "original." Their organization is continually studying and improving their product to better meet your needs.

Type 4550

Bulletin 21 shows other types of quarry cars. "Quarry Car Practice" published every now and then.

Easton Car & Construction Co.
Kansas City, Mo.—Easton, Pa.
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Richmond, Va., Pittsburgh, Pa.
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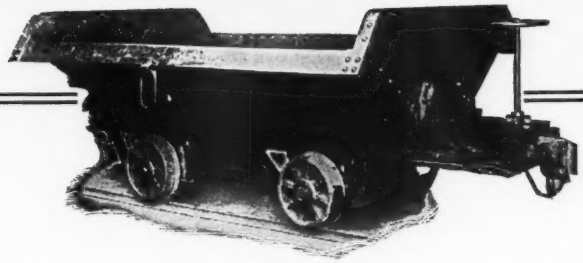
EASTON CARS
FOR EVERY PIT MINE & QUARRY



QUARRY CARS THAT ENDURE

Under Most Abusive Loading Conditions

ATLAS CARS are designed to reduce haulage costs and last longer

"They do both—Why not Investigate"

Engineering Service Especially Developed in Quarry Car Design

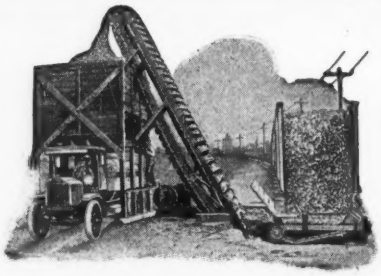
THE ATLAS CAR & MFG. CO.

1140 Ivanhoe Road **CLEVELAND, OHIO**

Quarry Cars, Rocker and Gable Bottom Cars, Special Cars of All Kinds

Here's What We GUARANTEE

When equipped with proper size feeder, the SUNBURY Automatic Unloader



Will load or unload a 50-ton car in 90 minutes!

***The* SUNBURY Automatic Unloader**

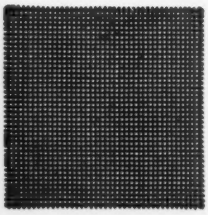
And one man can handle it. The first cost is reasonable and its return from the standpoint of its being able to substantially increase your profits makes it a very profitable investment.

Its automatic feature is important and will commend it to you. It is simple in construction, strongly built and economical in operation.

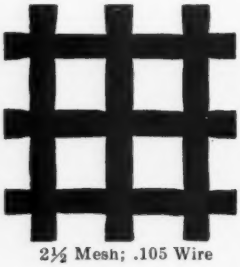
We will be pleased to send you an illustrated descriptive circular.

THE SUNBURY MANUFACTURING CO.

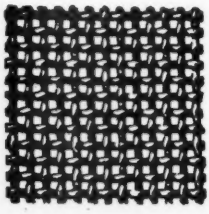
SUNBURY, OHIO



40 Mesh; .0135 Wire



2½ Mesh; .105 Wire



12 Mesh; .047 Wire

SERVICE! is the one thought behind every operation in the manufacture of—

"CLEVELAND" Double-Crimped Wire Cloth

Uniform fineness and long service will be assured by its use in screening SAND, GRAVEL, CRUSHED STONE AND CEMENT.

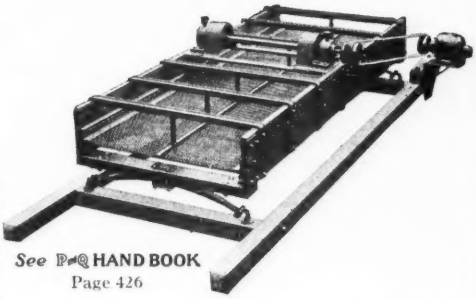
Large stock always on hand; special mesh manufactured to suit requirements at right prices.

THE CLEVELAND WIRE CLOTH & MFG. CO.

3579 EAST 78TH STREET

CLEVELAND, OHIO

Performance that Pleases



See P&Q HAND BOOK Page 426

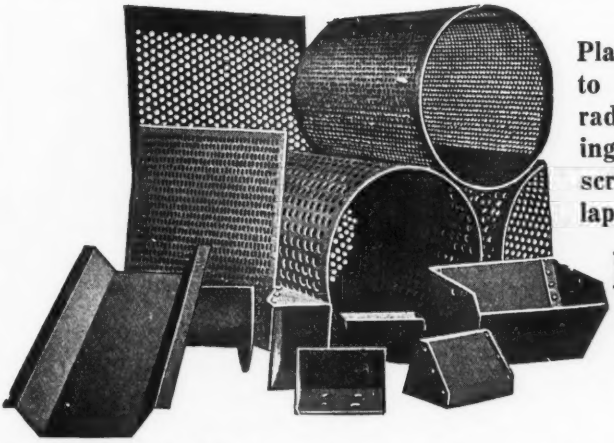
In a letter recently received from the Duluth Crushed Stone Company, they state as follows: *"Your screen had not been in operation more than a few hours before our Superintendent made a special trip to the telephone to call the City Office, saying that he did not believe that a screen could do such efficient work as this was doing, and one had to see the results in order to be satisfied. Other men have had an opportunity of taking a handful of samples from the oversize and they are also astonished to see that all of the fine particles and dust have been taken out."*

For a clean, sharp separation, install a UNIVERSAL.

Write for descriptive literature, today

UNIVERSAL VIBRATING SCREEN CO.
RACINE ~ ~ WISCONSIN

Perforated Metal Screens
FOR STONE, SAND, GRAVEL, ETC.



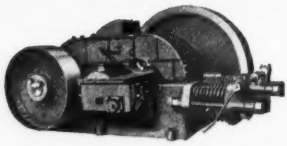
Plates flat; rolled to diameter or radius for revolving and conical screens butted or lap joints.

Elevator Buckets
in all styles and sizes

HENDRICK MFG. CO., 39 Dundaff Street CARBONDALE, PA.
30 Church St., New York City — 954 Union Trust Bldg., Pittsburgh, Pa.

TRAYLOR

Crushing Rolls



are the most economical, easily operated, dependable rolls that can be secured.

The fleeting roll device prevents annular corrugation of shells and assures lowest steel cost per ton of product.

ASK FOR BULLETIN

Traylor Engineering & Manufacturing Co.

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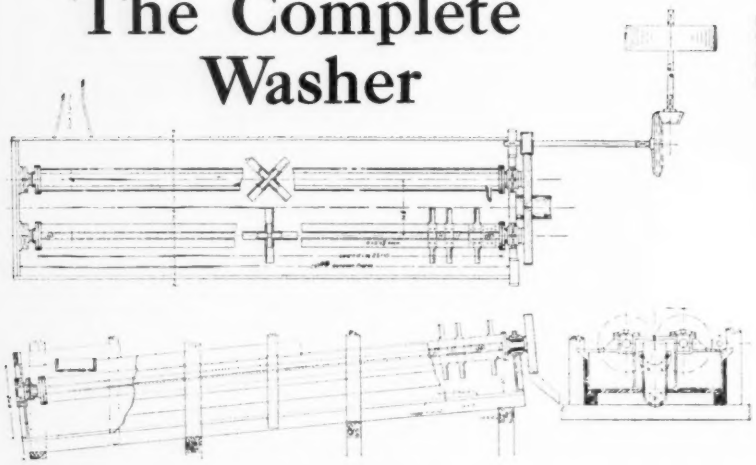
New York · Chicago · Los Angeles · Seattle
San Francisco · Oklahoma City · Salt Lake City · Timmons, Ont.

EXPORT DEPT., 60 Water St., New York, N. Y.

The Complete Washer



A McLanahan Improved Double Log Washer has proven to be the most successful and complete washing machine for gravel, limestone, phosphate rock, ores, etc.

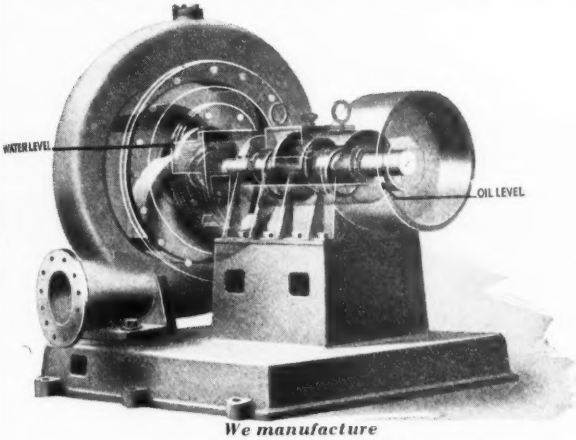
It will do your work thoroughly and give you the durability that cannot be surpassed.

Send for illustrated literature.

McLANAHAN STONE MACHINE CO.

HOLLIDAYSBURG, PENNA.

Tampa Dredging Pumps Are The Best



The curves of our runner flights are shaped right.

Our square shaped shell avoids spiral motion in discharge.

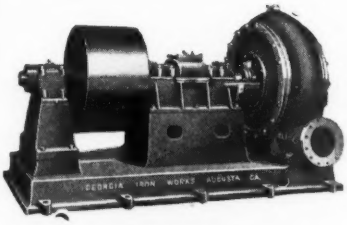
Our water seal makes air leaks impossible.

Our oiling system eliminates lubricating troubles.

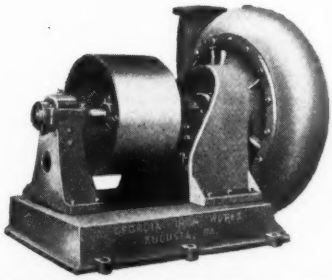
Our yardage production is unequaled.

We manufacture
4", 6", 8", 10", 12" and 15"
either direct connected to motor or belt driven

TAMPA SHIPBUILDING & ENGINEERING CO.
TAMPA, FLORIDA
WRITE FOR PRICES, DESCRIPTION and OUTLINE BLUE PRINT



Heavy duty belt driven sand and dredging pump built in 8", 10", and 12" sizes.



Overhanging type belt driven sand and dredging pump. Built in 6" and 8" sizes.

SAND PUMPS

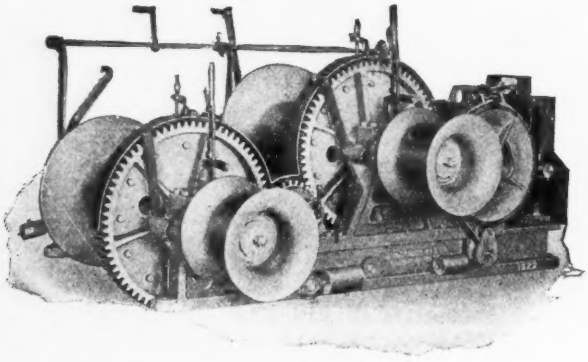
The accompanying cuts show two very popular types of belt driven units. These pumps are also built with bases for direct connection to motor.

Send for illustrated catalog showing our complete line of this equipment including flanged pipe fittings and hydraulic guns.

GEORGIA IRON WORKS
AUGUSTA, GA.
Established 1891

LIDGERWOOD HOISTS

Steam — Electric — Gasoline



Tell us what you wish in the hoist line.

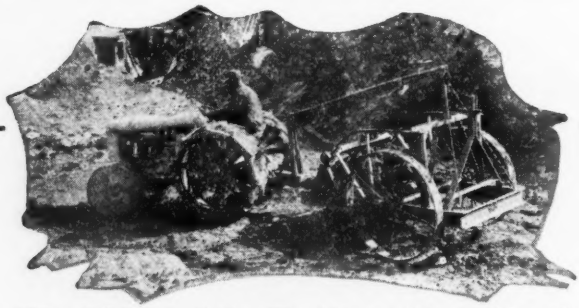
We build types to meet every need in hoisting service.

Send for Catalogs.

Our Engineers will consult with you at any time.

LIDGERWOOD MFG. CO., 96 Liberty St., New York

Chicago; Pittsburgh; Philadelphia; Detroit; Los Angeles; Seattle; Tacoma; Portland, Ore.; Brown-Marx Bldg., Birmingham, Ala. **Sales Agents:** Norman B. Livermore, San Francisco; Woodward, Wight & Co., New Orleans, La.; John D. Westbrook, Inc., Norfolk, Va.; Canadian Allis-Chalmers, Ltd., Toronto. **Foreign Offices:** Sao Paulo, Brazil; Rio de Janeiro, Brazil; London, Eng.



Would You Like To Strip More Earth Per Day At Less Cost Per Cubic Yard?

Every Pit & Quarry operator would yet hundreds have failed to investigate the dirt moving ability of The Miami-Fordson (one-man) Scraper.

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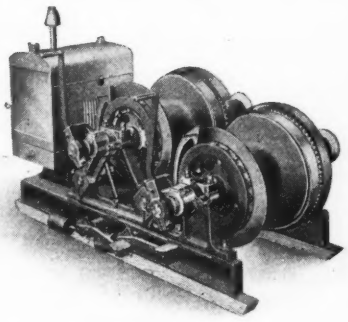

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The Domestic Double acting force trench pumps contains maximum capacity with minimum weight and bulk. Discharges through long pipe or hose to disposal point. Capacities 5,000 to 9,000 gallons an hour, 40 to 120 ft. vertical elevation. Our Bulletin "T.P." will give you complete information. Send for it.

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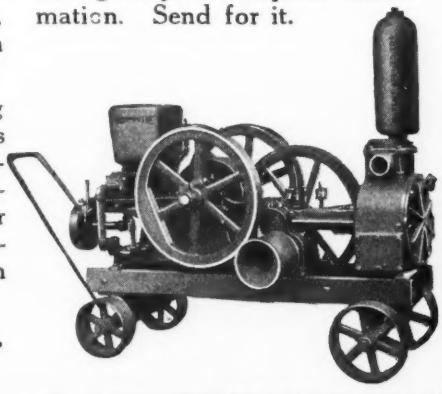
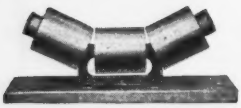


"Domestic" 4-TF Double Acting Force Trench Pump Unit



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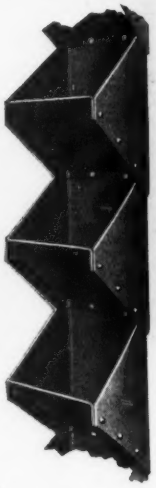

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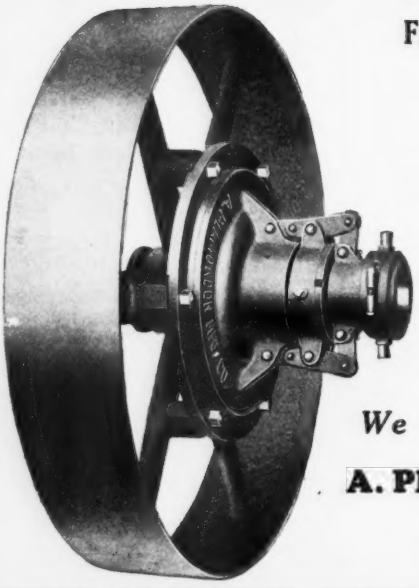

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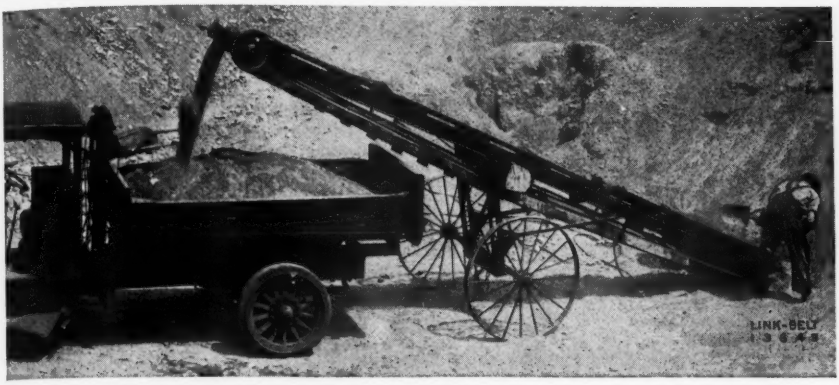

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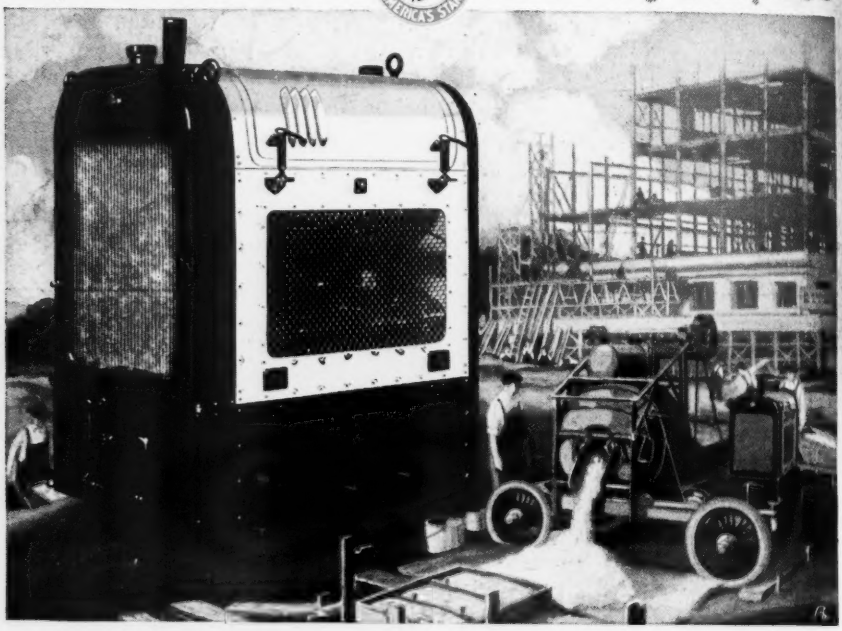

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